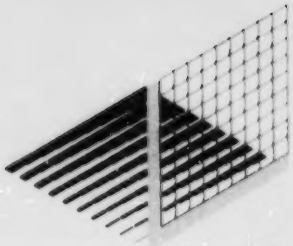


Gardner Pinfold
Consulting Economists Ltd.
1331 Brenton St.
Halifax, Nova Scotia
Canada, B3J 2K5
902-421-1720
Fax: 422-5343
e-mail:
tpinfold@gardnerpinfold.ns.ca
Home Page:
HTTP://www.gardnerpinfold.ns.ca

Socio-Economic Analysis for the Protected Areas Strategy

Prepared for:

Department of Natural Resources & Energy

Prepared by:

Gardner Pinfold Consulting Economists Limited

July, 2000

* **This study provides a socio-economic impact assessment of the eight Protected Areas in New Brunswick proposed by Dr. Louis LaPierre in "A Protected Areas Strategy for New Brunswick" (1999).**

Table of Contents

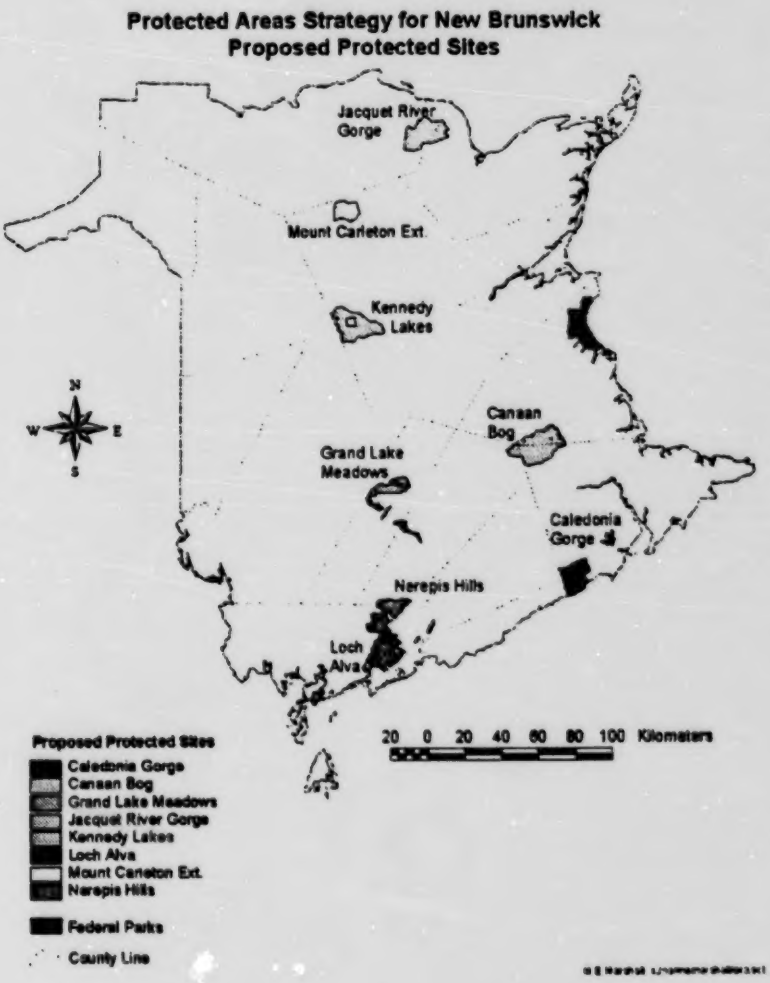
		page
EXECUTIVE SUMMARY		i
1.0	**INTRODUCTION AND BACKGROUND**	1
1.1	Study Objective	1
1.2	Assessing Benefits and Cost of Protected Areas	2
1.2.1	Benefits	2
1.2.2	Costs	4
1.3	Reliability of the Study Data	5
2.0	**SOCIO-ECONOMIC PROFILE OF THE PROTECTED AREAS**	7
3.0	**IMPACT ANALYSIS**	57
3.1	Benefits	57
3.1.1	Biodiversity	57
3.1.2	Carbon	61
3.1.3	National and International Agreement on Obligations	63
3.1.4	Education	64
3.1.5	Benchmarking and Other Research	65
3.1.6	Ecotourism & Recreational Potential	65
3.1.7	Water Supply	69
3.1.8	Susceptibility to Pests and Fires	69
3.1.9	Non-Measured Benefits	70
3.2	Costs	72
3.2.1	Forestry	72
3.2.2	Mining and Mineral Development	78
3.2.3	Trapping	83
3.2.4	Hunting and Sport Fishing	84
3.2.5	Snowmobiles	91
3.2.6	ATV Use	92
3.2.7	Corridors	93
3.2.8	Establishment and Administrative Costs	94
4.0	**FIRST NATIONS INTERESTS**	97
5.0	**IMPACTS ON ADJACENT LANDS**	99
5.1	Impact of Protected Areas on Lands Adjacent to the Protected Areas	99
6.0	**NET IMPACTS**	103
6.1	Ecosystem Service Net Impacts	104
6.2	Net Impacts Summary	107
REFERENCE LIST		109

Appendix 1	Contact List
Appendix 2	Forestry
Appendix 3	Definition of Terms Related to Ecosystem Valuation
Appendix 4	International and National Commitments
Appendix 5	Mineral Potential for Each Protected Area

EXECUTIVE SUMMARY

This study provides a socio-economic impact assessment of the eight Protected Areas in New Brunswick proposed by Dr. Louis LaPierre in "A Protected Areas Strategy for New Brunswick" (1999). Map 1 shows the location and shape of each of these areas.

Map 1 - Proposed Protected Area Sites



Ecosystem services are the beneficial outcomes that result from ecosystem functions (e.g., better fishing and hunting, cleaner water, more trees, and so on). The establishment of Protected Areas will create positive impacts that enhance or expand some ecosystem services and negative impacts that diminish some current activities such as forestry. Enhanced services are called benefits; diminished activities or services are called costs. Costs may be monetary costs or opportunity costs, that is benefits that must be given up with protection.

Under the working assumption used in this report, many of the commercial and recreational activities that currently take place inside the proposed Protected Areas will be prohibited with the declaration of protection. This will result in a variety of costs to society. The major costs will be borne by commercial activities such as those conducted by the forestry and mining industries. Various recreational pursuits such as hunting and fishing will also experience some loss.

The net impacts that result from introducing new activities or expanding existing activities and discontinuing existing activities in Protected Areas are as follows:

Benefits

Biodiversity

Biodiversity is treated as the underlying foundation for ecosystem services. Impacts related to it are captured through the analysis of the various ecosystem services.

Carbon

Carbon sequestration is estimated to have an annual value of $1.43 million. This is only partly incremental, since Protected Area lands would still be forested without protection. The benefit is also global in nature; and can only be partially captured in New Brunswick. It can be considered as a contribution to Canada's commitments on global climate change.

National and International Commitments

The eight proposed sites will add 159,305 ha to New Brunswick's Protected Areas network. This will bring the total protected areas in New Brunswick up to about 3.5% of the provincial land base. Setting up the eight Protected Areas contributes to Canada's commitment for a national system of Protected Areas.

Education and Research

Public education will not be a major use of the Protected Areas. The main information media are expected to be an information brochure and a website at a cost of about $15,000. The Areas will be available for comparative and baseline research on undisturbed areas. They can serve as unmanaged benchmarks for measuring changes in province's natural environment and, in this sense, offer new opportunities for ecosystem research.

Eco-tourism

Virtually no use is made of the Protected Areas for eco-tourism, so any increase in eco-tourism use will be incremental. There is good potential in the sense that eco-tourist parties tend to stay longer and spend almost twice as much per trip (about $900) as non-nature tourist parties. However, the fact that none of the areas represent truly worldclass natural features will limit the overall potential impact.

Water Supply

Two existing water supply areas are included in three Protected Areas. These water supplies already operate with higher levels of protection (wider buffers, etc.) than regular forestland. Little or no incremental gains are foreseen although a small increase in security of supply is possible.

101-03169/

Susceptibility to Pests and Fires

The study found no substantial changes with the introduction of the Protected Areas because there would be little change in incidence in forest fires or pests and disease, and the costs of dealing with either would remain within normal parameters.

Non-Measured Benefits

Passive use values, such as existence value and bequest value, and option value, the value people place on being able to use the areas in the future, are all identified as possible values New Brunswickers will attach to the proposed Protected Areas. These are values that can only be realized if the areas are protected. Currently there are no specific estimated values available based on New Brunswick data.

Costs

Forest Harvesting

Harvesting in the Protected Areas accounts for about 97 jobs and associated income. About 80-100% (80 to 97 jobs) will be lost, as will about $2.4 million in royalties annually. This is due to a tight wood supply situation and the fact that most harvesting is done on piece rate by contractors who operate in certain areas. The job loss will correlate closely to the percentage reduction in Annual Allowable Cut (AAC). Impacts will be concentrated near Jacquet River, Kennedy Lakes and Canaan Bog as these areas account for 62% of AAC reduction.

Sawmills

Loss of access to fibre will be evenly distributed across all licensees and sub-licenses. On average, no mill should experience a reduction in wood supply greater than 2%. Small mills that have not been modernized are the most vulnerable. Other mills will either secure more expensive wood or will operate at lower plant utilization. Job loss is not likely to correlate directly to the loss of fibre. The study estimates about 20-50 jobs and associated income will be lost.

Pulp Mills

The results are very similar to the sawmills, with an estimated 20-50 jobs lost. This is roughly 20-50% of the 104 pulp mill jobs and income attributable to wood harvested from the Protected Areas.

Resident and Non-Resident Hunting

Resident hunters are estimated to spend about $800,000 on hunting activities in the Protected Areas. About 80% of this will be redistributed to other areas. A few of the major hunting areas such as Loch Alva may not be in a position to transfer effort to alternative grounds.

Non-Resident Hunters in the PA's spend about $66,000, of which up to 20% or $15,000 could be lost. Bear outfitters may have to incur higher costs to bait but it seems unlikely they would give up any of the licenses they currently use.

Sportfishing

Total Expenditure in the Protected Areas is estimated at $425,000. For most Protected Areas, the impacts would be small because similar fishing opportunities are available nearby with the possible exception of Loch Alva and Nerepis Hills.

Trapping

The Protected Areas are estimated to account for about $50-$100,000 of trapping activity, of which between $25,000 and $50,000 would be lost. Most trappers work in areas which, by gentlemen's agreement, are exclusive to them, so it will be difficult for displaced trappers to move to new areas.

Snowmobiling

There would be a minimal reduction in activity at the provincial level. Alternative trails can be identified in close vicinity to the Protected Areas should major through trails be closed. There could be some local businesses affected if trails are diverted away from current routes.

ATV Use

The Protected Areas would cause minimal reduction in activity at the provincial level. There is a sufficient alternative trail network in proximity to all of the Protected Areas that no net loss will be attributed to this activity. However, Jacquet River and Central Highlands could pose obstacles to formal trail development.

Metallic Minerals

Most Protected Areas seem to have very little potential to attract major exploration programs aside from Jacquet River. Central Highlands and Nerepis Hills may also result in a small net loss. The main current value relates to potential exploration activity while the ultimate impact would be the discovery of an economic mineral deposit. Exploration programs are closely attached to the mineralization characteristics of a given area and the market circumstances of the day.

Peat

There is a defined peat resource in the Canaan Bog with potential for development.

If production is not allowed, commercial value of the resource will be lost at some point in the future. There may be other optional peat resources available.

Transportation and Communication Corridors

Existing transmission lines, rail right-of-ways, gas distribution lines and roads will remain in place and no new corridors planned. These will have no incremental impacts.

Establishment and Administrative Costs

The incremental cost of initial boundary line marking using blazes and signage will be about $375,000; with an annual cost of $60,000 starting in five years. It should be possible to reduce these costs by making maximum use of natural boundaries such as roads, county lines, rivers and streams and using digitized land base to create appropriate maps. The study estimates no incremental enforcement costs as they can be absorbed within existing budgets and making use of volunteers for some enforcement functions.

Overall, it was not possible to measure all of the benefits and costs in monetary terms. Thus, the comparison of benefits with costs involves a mix of qualitative and quantitative measures. This means that New Brunswick decision-makers must determine if, in their judgement, the identified benefits associated with protection are worth the trade-offs or costs that will be incurred.

Finally, note that this analysis has been based on a defined set of Protected Area boundaries. Although we have not completed a detailed assessment, it is possible that some adjustment to various Protected Area boundaries could serve to moderate or reduce the losses and potential losses imposed on the forestry and mineral industries.

1.0 INTRODUCTION AND BACKGROUND

Since the early 1970s, various groups (scientists, environmentalists, the Environmental Council, as well as citizens groups), have recommended the establishment of a Protected Areas network for New Brunswick that would contribute to the conservation of New Brunswick's biological diversity. These Protected Areas would serve as outdoor laboratories in environmental education and for comparative and baseline research. Protected Areas would serve as unmanaged benchmarks or controls against which changes in the province's natural environment could be measured. Currently, in New Brunswick, roughly 1.4% of the province can be classified as meeting these criteria.

In 1997, the Department of Natural Resources and Energy asked Dr. Louis LaPierre, (environmental ecologist at the University of Moncton), to propose a strategy for developing a comprehensive network of Protected Areas for New Brunswick. The results of his study were published in 1999 in a report entitled "A Protected Areas Strategy for New Brunswick" (hereafter referred to as the Strategy). Dr. LaPierre recommended that the province select a Protected Area to represent each of the province's seven distinct eco-regions - twelve new Protected Areas in all. After consideration of the comments and suggestions received in the course of the public consultation process, eight areas were retained as representative options to represent the seven eco-regions.

1.1 Study Objective

The overall objective for this study is to provide a socio-economic analysis of the proposed Protected Areas Strategy, on behalf of the New Brunswick Department of Natural Resources and Energy. The study will evaluate the social and economic costs and benefits of implementing protection on the eight sites proposed Strategy. The study assesses the social and economic impacts of these eight proposed sites with respect to changes in current land-use patterns on the affected areas.

In carrying out the study, we conducted the following research and analysis:

- A review of protection policies proposed in each of the protection areas selected and existing land-use activities in all eight proposed Protected Areas;
- Identification and quantified (if possible) expression of current activities for the proposed protection sites;

- Created a classification and ranking scheme for the costs and benefits arising from each land use;
- Designed methods to measure (quantified in dollar terms as far a possible) the costs to current users and the benefits to future users attributable to the implementation of the Protected Areas Strategy over the next 25 years (at both the local and provincial level);
- Estimated the impacts related to employment gains and losses in all economic sectors;
- Assessed the social implications of the economic impacts identified; and,
- Assessed the impacts on First Nations communities of implementing the proposed Strategy for Protected Areas in the provinces.

Socio-Economic Impacts

This study includes analysis of the socio-economic impacts (benefits and costs) on the following sectors and the affected parties:

- Biological diversity;
- Eco-tourism;
- National and international commitments;
- Forestry and forest-based industries;
- Minerals and energy activities (exploration, development, and mining);
- Outfitting including guiding, and tourism in general;
- Recreational pursuits - consumptive and non-consumptive (e.g., hunting, fishing, trapping, motorized-vehicle use, hiking, etc.);
- Research and education;
- Corridors - transmission lines, pipelines, highways, and trails; and,

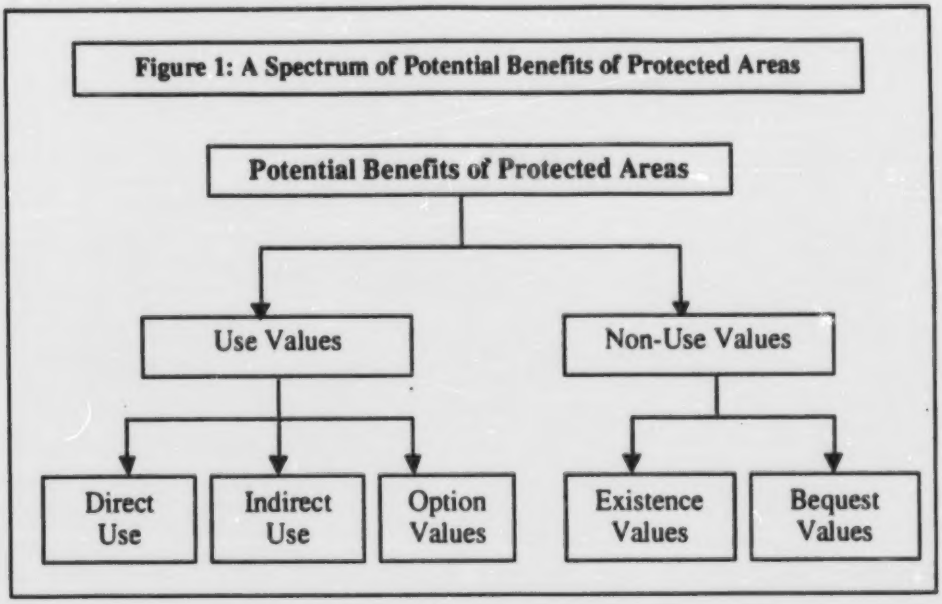
1.2 Assessing Benefits and Cost of Protected Areas

1.2.1 Benefits

In the first instance, it is natural to consider the benefits of protection as arising from permitted uses of the Protected Areas. However, the economics literature is clear that there can be benefits from both use and non-use. Figure 1 highlights the spectrum of possible benefits of Protected Areas that the study considers. These benefits range from direct use benefits derived from goods and services provided by the Protected Area: this might include hunting, forest products, fishing, and so on. Indirect use refers to functional benefits such as nutrient cycles, carbon storage and sequestration. Option value is the value society places on having the Protected Area available for possible

future uses, as opposed to current uses. Non-use benefits are typically defined as the bequest value attached to the ability to bequeath the Protected Area to future generations, and existence value, the value society places on having the Protected Area whether or not people ever use the area for any human activity.

Figure 1: A Spectrum of Potential Benefits of Protected Areas



There are a range of benefits of Protected Areas accruing to indirect users that include both use and non-use values. For example, there can be downstream users of a Protected Area. If the Protected Area serves as a water supply, it provides benefits to downstream users, specifically in this case, municipalities. Also, it may offer a range of educational or research benefits to society. More globally, Protected Areas can provide benefits such as biodiversity conservation, carbon sequestration, habitat for endangered and migratory species, replenishing fish stocks for traditional fisheries, impacts related to climate change, and so on.

Within the context of this study, we note that the Strategy identifies potential benefits which may accrue as a result of implementing protection on the eight proposed sites. These include:

- Protected Areas will function as controls, allowing for comparisons with managed landscapes, thus helping scientists and land managers better understand the impacts of their management options across the landscape;
- Protected Areas will play an important role in filling the knowledge gaps that presently exit in environmental research;

- Protected Areas will function as important ecological baselines or benchmarks against which managers are better able to measure how predicted management strategies evolve in relation to the natural process;
- Protected Areas will contribute to the conservation of New Brunswick's biological diversity (increased security of biodiversity in the province as a result of Protected Areas is linked to the intrinsic benefits of Protected Areas such as "Option Value" and "Existence Value" benefits);
- Protected Areas provide an opportunity to assess change in a natural system over a long-time frame.

Eco-tourism has been identified as a possible future use of the PAs. The study considers the possible benefits of eco-tourism development.

The study assesses the overall impact of these Protected Area benefits at the local level for areas benefitting from the proposed protection sites as well as at the provincial level to obtain province-wide estimates for the eight proposed areas.

1.2.2 Costs

The costs of protection are in the first instance identified as the economic value of lost opportunities. For example, forestry operations harvest roundwood; mineral development may lead to mining operations; the in-stream recreational benefits come from fishing, canoeing and so on. These are typical examples of activities that would be controlled or excluded from a Protected Area. They thus become the basis for the cost of protection. The people or groups wishing to turn these opportunities into real economic activity or who may be operating activities already in or near Protected Areas bear the costs of protection.

When the activities are provided by commercial operators for profit, the cost becomes the lost operator profit, assuming it is possible to re-employ the labour in alternative activities. If alternative employment is not possible, the lost jobs and associated wages become part of the cost. Where all activity is done as a recreational outing, such as hiking or riding an ATV, the cost is the loss in economic welfare (i.e. utility) from not being able to do it in the Protected Area. Whether this is really a cost depends on whether readily available substitutes exist; if they do, it can be argued that there is no cost associated with protection for this activity. The study considers every activity from this point of view: costs are assigned only where there is no alternative employment for resources that cannot be used in a Protected Area or no alternative location to perform an activity excluded from the Protected Area.

The estimation of costs addresses several specific points:

- Direct costs are measured to include the opportunity costs imposed on Protected Area users and any additional costs they incur to meet protection policy requirements.
- In most cases, the main cost to a user will be the reduction in net revenue[1] (which could be called profit, or more properly, economic surplus) caused by a reduction in the scale of operation or the complete cessation of production. Assuming that short run re-employment of labour is not possible, this aspect of cost assessment focuses on income and employment losses since these are indicators of the human and social costs.
- The additional costs (over and above what would have been incurred without the protection policy) to meet exclusion requirements while continuing to operate in or near a Protected Area are also legitimate costs of protection.
- Indirect costs refers to expenses incurred by users related to relocation of their business activity to other sites which may be higher cost or less productive locations. This aspect was considered for all activities identified in the PAs where alternative locations may be available.
- The costs of protection also includes a range of possible monetary or budgeting costs associated with the administration and management of Protected Areas resulting from implementation the proposed Strategy for Protected Areas.

1.3 Reliability of the Study Data

The data and information collected and analyzed for this study came from four main sources:

- Economic and financial data collected systematically by Statistics Canada;
- Administrative data such as mineral occurrence records and mineral claims; estimates of New Brunswick peat resources from DNRE; estimates of potential round wood production and related assets such as forest roads; and recreational fishing and hunting data including licence data, hunting harvest data for big game such as deer, moose and bear;

[1] We say net revenue because when a business scales down its operation, it will release some of the resources it uses as inputs for alternative uses and its costs fall accordingly. Thus, technically, it loses only the producer surplus (total revenue minus opportunity cost) associated with the reduction in output level.

- Informal information (a mix of qualitative and quantitative data) collected through interviews with informed observers. Examples of the individuals and organizations contacted include DNRE regional staff (e.g., regional geologists, forest rangers, etc.) and representatives of organizations whose members may have made use of some of the proposed Protected Areas such as the New Brunswick Snowmobile Association and the New Brunswick Outfitters Association. Industry organizations such as the New Brunswick Sub-Licensee Forestry Alliance and the New Brunswick Mining Association were also consulted[2]; and,
- Published academic articles and books, documents and reports commonly referred to as the literature.

The study findings result from analysis of the benefits and costs of protection using the data and information collected on each of the actual or potential uses identified for the PAs. To give the reader a sense of the type of data that underlie the various findings, we use the following symbols. As a general rule, one would expect greater variability in the findings as you move from systematically-collected data to interview data to information extracted from the literature.

* The analysis is based primarily on systematically-collected data with a high degree of reliability. This includes Statistics Canada data on the forest industry and DNRE administrative data on the forest industry and the minerals industry that can be specifically related to the PAs.

\# The analysis makes extensive use of inferences based on a mixture of systematically collected administrative data at the provincial level and for sub-provincial regions that do not correspond to the PAs (e.g., hunting licenses, big game harvest). This is information is supplemented by local knowledge specific to the PA collected through interviews.

} The analysis is based completely or almost completely on local knowledge collected through interviews with knowledgeable observers.

\+ The analysis makes extensive use of literature to make up for the lack of any specific information pertaining to New Brunswick or the PA's.

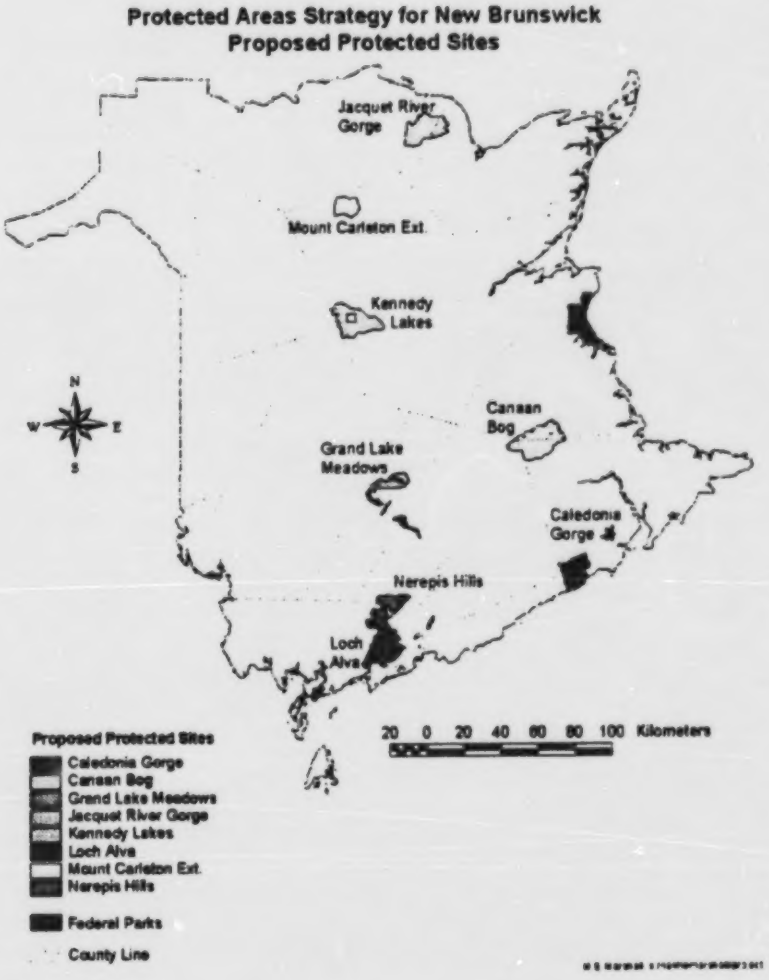
These symbols are attached to section headings throughout the text of the report. In some cases, multiple symbols are used to indicate a mixture of analytical methods and data.

[2] A complete list of the organizations and individuals contacted during the study is given in Appendix 1.

2.0 SOCIO-ECONOMIC PROFILE OF THE PROTECTED AREAS

This section provides a socio-economic profile of the eight proposed Protected Areas[3]. This profile identifies the socio-economic environment surrounding each Protected Area. It also identifies the types of economic activities currently taking place in each area, the intensity level of the activity, the importance of the activity in provincial context, and, where possible, a measure of the value of the economic activity. Map 1 shows the location and shape of each of these areas.

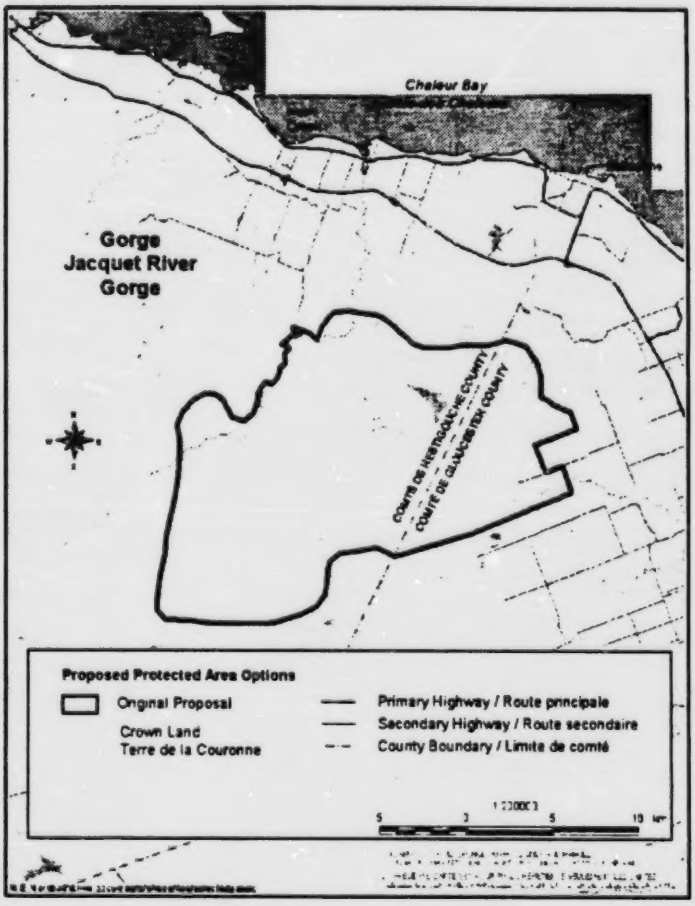
Map 1 - Proposed Protected Area Sites



[3] As proposed in "A Protected Areas Strategy for New Brunswick", 1999 by Dr. Louis LaPierre.

Notes - Jacquet River

Map 2 - Jacquet River



Jacquet River – Main Characteristics

Natural

The Jacquet River area is representative of the Northern Uplands Eco-region. It captures the hilly plateau and river gorges that are typical of the Northern Uplands Eco-region. The site has a low level of fragmentation and it comprises the water supply for the region.

Location and Economy

This proposed Protected Area is 27,300 ha and is located about 15 km inland from Belledune. Bathurst is a major population centre located about 25 km away. The economy of the region is resource based with significant employment found in the mining and forestry sectors. Three wood processing facilities are located in the region.

Mineral Potential

This area has significant mineralization in a north south band through the centre of the area. In the past it has been extensively claim staked and explored. There is currently activity related to a gold play to the south west of the area. Relative to the other seven areas Jacquet River has a greater potential for mineral development.

Forestry Potential

Over 11,000 ha of harvest blocks are scheduled for next 25 years. Jacquet River accounts for about 24% of the total wood supply in the eight Protected Areas. The area does have a high percentage of inoperable territory (due to steep slopes) and also has forestry constraints imposed by the fact part of the area is the water supply for the region. It is located in two Crown Licenses 1 and 2. Major processing facilities supported by these licenses include[4]:

License 1
Licensee – Bowater
Sub-Licensees – 15
License 2
Licensee – Smurfit Stone Container Corp.
Sub-Licensees – 12

Trapping

Area is important for trapping.

Recreation

- Substantial local hunting (moose and bear - no deer) and fishing.
- Limited outfitting activity.
- Major groomed snowmobile route passes through the area.
- ATV use by local people increasing.

[4] All sub-licensees are listed in Schedule F presented in the forestry appendix – Appendix 2.

Jacquet River – The Natural and Socio-Economic Features of the Region Surrounding the Protected Area

Variable	Indicator
Natural Features	
Eco-region	Northern Uplands (2)
Geological zone	Tobique-Chaleur and Elmtree teranes
Socio-Economic Features	
Population of nearby communities	Bathurst- 13,815 City/25,415 agglomerate (25 km) Belledune and Jacquet River – 2,060 (15 km) Pointe-Verte – 1,122 (25 km) Petit Rocher – 2,078 (20 km) Campbellton – 8,404 city/16,867 agglomerate (70 km)
Major road nearby	About 10 km west of Highway 11 near Belledune
Economic Features	
Economic base	Resource base: forestry (both logging and processing), mining (lead and zinc) and service based economy. Bathurst has two wood processing companies (NBFPA) and Belledune has one wood processing companies. Thermal power generating station in Belledune strengthened the regional economy.
Employment/unemployment	Unemployment rate is above provincial average; the percentage of people in Bathurst working in primary industries is higher than the provincial average, and the percentage of people working in secondary industries is lower than the provincial average.
Proximity to other major tourism/recreation resource	Numerous beaches on Baie des Chaleurs (15 km+) Acadian Historical Village (70 km) Mount Carleton Provincial Park (130 km)
Adjacent Land Tenure	Crown land surrounds about 70-80% of the Protected Area. Private land between Route 11 and northeast side.

Jacquet River – Socio-Economic Activities that Take Place in the Proposed Protected Area

Socio-Economic Activity Evaluation Criteria								
	Is the Activity Present?			Intensity of Activity				
	Yes	No	Comment	H	M	L	Trend	Comment
Mineral: Mines/Peat Opers.		√						
Known Occurrences	√		Numerous occurrences.	√				
Exploration/ Claimstaking	√		Significant claim staking in past. Active Claims at present.	√			⇑	Claimstaking has been intense in past.
Forestry: Logging	√		11,368 ha of harvest blocks over next 25 years.			√	⇔	AAC-47,885 m3/yr
Wildlife: Hunting: Big Game	√		Important moose area; some bear.				Moose ⇑ Deer – Bear ⇔	No deer hunt in this area.
Small Game	√							
Waterfowl		√						
Trapping	√		Important in this area.					
Sport Fishing	√							
Recreation (Non-Consumptive): Camps	√		12 – Campsite leases		√		⇔	Watershed restrictions limit potential.
Snowmobile	√		Major trail passes through area.	√			⇑	
ATV	√			√			⇑	
Camping/Boating	√					√		
Canoeing/Hiking	√					√		
Commercial Tourism/ Outfitter		√						
Road Access	√		Network of forest roads. Two local provincial roads provide access on northeast and east sides. A network of about 50 km of forest roads exist in the protected area providing seasonal access; some additional poor roads.	√				Road density: 0.89 km/km2
Transmission Lines		√						
Water Supply	√							

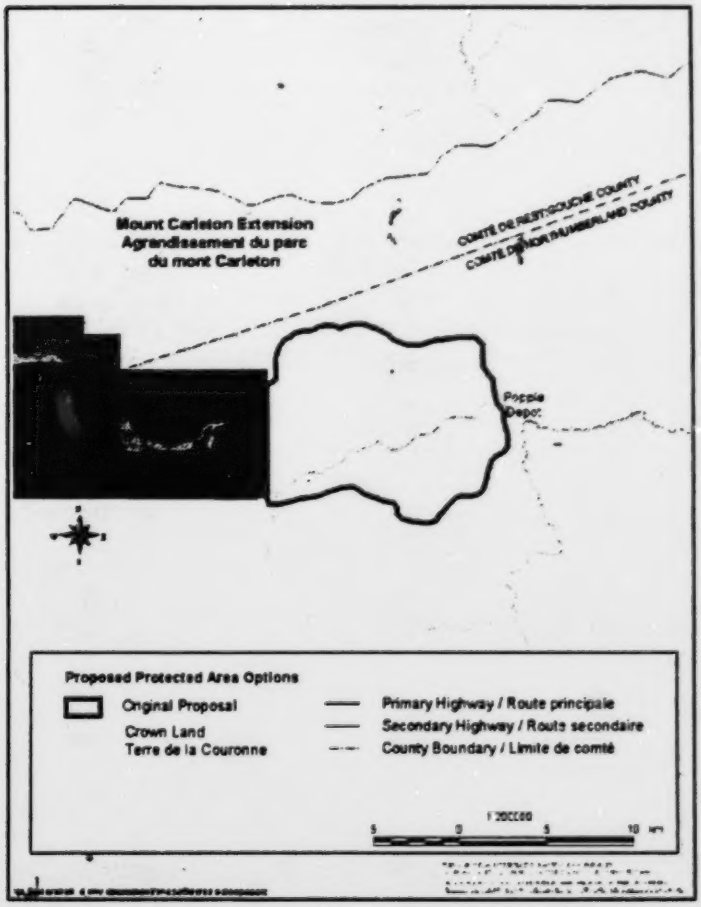
H = High
M = Moderate
L = Low

Socio-Economic Activity Evaluation Criteria								
Significance to total activity in province					Economic Value (1)			
	H	M	L	Comment	H	M	L	Actual Estimate
Mineral: Mines/Peat Opers.							√	
Known Occurrences								
Exploration/ Claimstaking	√			Current interest to southwest portion - gold play.	√			$90,000 over next five years.
Forestry: Logging	√			About 23% of loss attributable to all Protected Areas.	√			Total Direct and Indirect Employment: 126 jobs Income: $41 million
Wildlife: Hunting: Big Game		√		Important moose area. Not important deer area. Moderate bear area.			√	Total Direct and Indirect Employment: <1 Income: $6,000
Small Game		√					√	
Waterfowl			√				√	
Trapping		√				√		
Sport Fishing		√				√		Total Direct and Indirect Employment: 2 jobs Income: $41,000
Recreation (Non-Consumptive): Camps		√						
Snowmobile		√					√	
ATV		√					√	
Camping/Boating			√				√	
Canoeing/Hiking			√				√	
Commercial Tourism/ Outfitter			√				√	
Road Access			√					
Transmission Lines			√					
Water Supply								

(1) Blank cells indicate no estimate available at the PA level.

Notes - Central Highlands (Mount Carleton Extension)

Map 3 - Central Highlands (Mount Carleton Extension)



Central Highlands – Main Characteristics

Natural

The extension of Mount Carleton Provincial Park captures the rugged mountains typical of the eco-region. The topography of the area is somewhat less diverse than Mount Carleton Park but the site contains a greater soil and eco-site diversity, thus making these two areas very complementary from a representativity standpoint.

Location and Economy

This proposed Protected Area is 12,200 ha and is not located near any major population centres. Saint Quentin is the closest at nearly 60 km. Plaster Rock is about the same distance. The local economy is very rural in nature. Forest harvesting is the main economic activity and some tourism sector activity also exists.

Mineral Potential

There is at present considerable claim activity along the northeast boundary of this Protected Area. Apparently this area has a favourable Bathurst Camp type mineralization, although most of the area of interest lies outside the current boundary. Mineral development potential is relatively high for this area compared with most of the other Protected Areas except Jacquet River and perhaps Nerepis Hills.

Forestry Potential

About 4,100 ha of harvest blocks are scheduled for next 25 years. The Central Highlands account for about six percent of the total wood supply in the eight Protected Areas. It is located in two Crown Licenses 2 and 4. Major processing facilities supported by these licenses include[5]:

License 2
Licensee – Smurfit Stone Container Corp.
Sub-Licensees – 12

License 4
Licensee – Repap New Brunswick
Sub-Licensees – 23

Trapping

Area is important for trapping.

Recreation

- Limited hunting and fishing.
- About 100 bear licenses are used by outfitters in the area.
- Canoeing quite popular on the Nepisiguit River
- First Nations traditional walking trail planned.
- Snowmobiling is important with groomed trail in the area and the Governor's Wilderness Lodge located just to the east.

---

[5] All sub-licensees are listed in Schedule F presented in the forestry appendix – Appendix 2.

Central Highlands (Mt. Carleton Extension) – The Natural and Socio-Economic Features of the Region Surrounding the Protected Area

Variable	Indicator
Natural Features	
Eco-region	Highlands (1)
Geological zone	Tobique-Chaleur and Miramichi teranes
Socio-Economic Features	
Population of nearby communities	Saint-Quentin – 2,424 (60 km) Kedgwick – 1,221 (100 km) Plaster Rock – 1,220 (80 km)
Major road nearby	About 10 km south of Highway 180
Economic Features	Resource base: forestry, minerals (some mining claims in Protected Area), outdoor recreation, agriculture.
Economic base	Sparse population; rural economy. Saint-Quentin, Plaster Rock and Kedgwick have three, two and one wood processing companies, respectively (NBFPA).
Employment/unemployment	Unemployment rate is above provincial average; the percentage of people in Saint-Quentin working in primary industries is higher than the provincial average, and the percentage of people working in secondary industries is higher than the provincial average.
Proximity to other major tourism/recreation resource	Mount Carleton Provincial Park adjacent to Protected Area; canoeing and fishing on Tobique River and other rivers; hunting outfitters in Nictau. Les Jardins Park Complex (170 km).
Adjacent Land Tenure	All Crown land surrounding Protected Area; Mount Carleton Provincial Park on west side of Protected Area.

Central Highlands – Carleton Park – Socio-Economic Activities that Take Place in the Proposed Protected Area

Socio-Economic Activity Evaluation Criteria								
	Is the Activity Present?			Intensity of Activity				
	Yes	No	Comment	H	M	L	Trend	Comment
Mineral: Mines/Peat Opers.		√						
Known Occurrences	√		Two occurrences.					
Exploration/ Claimstaking	√		Active claims in northeast corner and SE.		√		⇑	Areas are of current interest because of favourable rock – Bathurst Group mineralization.
Forestry: Logging	√		4,135 ha of harvest blocks next 25 years.				⇔	AAC-17,404 m3/yr
Wildlife: Hunting: Big Game	√		Deer, moose and bear.			√	⇓	Deer population is down, closed to deer hunting, area has never been good for deer.
Small Game	√					√		
Waterfowl		√						
Trapping	√		Limited along road access.			√		
Sport Fishing	√		Usually related to canoeing.			√	⇔	
Recreation (Non-Consumptive): Camps	√		29 camps	√			⇔	Most camps located in northeast corner
Snowmobile	√		River Road groomed.	√			⇔	Governor Wilderness Lodge located to east reported as many as 5,000 snowmobiles per year.
ATV	√					√	⇑	Remoteness and low hunting reduces ATV use compared to other areas.
Camping/Boating	√		Trailer campsite just outside; also some along canoe route.		√			
Canoeing/Hiking	√		Nepisiguit River	√			⇑	Up to 50 canoe parties/day
Commercial Tourism/ Outfitter	√							
Road Access	√		50 km. Five forest roads provide access to protected area (one from Mount Carleton Provincial Park); some poor roads concentrated around camps (25 one acre camp leases) and in southern part of protected area; winter access by snowmobile only. A network of about 25 km of forest roads exist in the Protected Area (providing seasonal access); road follows Nepisiguit River.		√			Road density: 0.41 km/km2
Transmission Lines		√						

H = High
M = Moderate
L = Low

Socio-Economic Activity Evaluation Criteria								
Significance to total activity in province					Economic Value (1)			
	H	M	L	Comment	H	M	L	Actual Estimate
Mineral:								
Mines/Peat Opers.								
Known Occurrences			√				√	
Exploration/ Claimstaking		√					√	$30,000 in area over next five years.
Forestry:								
Logging			√	About 8% of loss attributable to all Protected Areas.			√	Total Direct and Indirect Employment: 45 jobs Income: $1.5 million
Wildlife:								
Hunting:								
Big Game			√	Relatively isolated from major population centres, moose about 8% of province. Low bear harvest as well.			√	Total Direct and Indirect Employment: <1 jobs Income: $10,000
Small Game			√				√	
Waterfowl								
Trapping			√				√	
Sport Fishing			√				√	Total Direct and Indirect Employment: 1 job Income: $26,000
Recreation (Non-Consumptive):								
Camps		√						
Snowmobile	√			Important wilderness area and overnight location.			√	Associated spending occurs outside the PA.
ATV			√	Small local population base.			√	
Camping/Boating			√				√	
Canoeing/Hiking			√				√	
Commercial Tourism/ Outfitter			√				√	
Road Access								
Transmission Lines								

(1) Blank cells indicate no estimate available at the PA level.

Kennedy Lakes – Socio-Economic Activities that Take Place in the Proposed Protected Area

Socio-Economic Activity Evaluation Criteria								
	Is the Activity Present?			Intensity of Activity				
	Yes	No	Comment	H	M	L	Trend	Comment
Mineral: Mines/Peat Opers.		√						
Known Occurrences	√		Two granite rock underlies virtually entire region with little evidence of mineralization.			√	⇔	
Exploration/ Claimstaking		√				√	⇓	
Forestry: Logging	√		12,282 ha of harvest blocks over next 25 years.	√			⇔	AAC-45,547 m3/year.
Wildlife: Hunting: Big Game	√		Deer, moose and bear			√	⇓	Deer hunting is poor moose-mediocre. Lot of camps to north of PA that generate pressure.
Small Game	√					√		
Waterfowl		√						
Trapping	√				√			
Sport Fishing	√							
Recreation (Non-consumptive): Camps	√		5 campsites			√	⇔	
Snowmobile	√		Main north south Haul Road used near Halfway Inn.		√		⇔	
ATV	√					√		
Camping/Hiking	√					√		
Canoeing	√		Limited on North Branch in Spring.			√		
Commercial Tourism/ Outfitter	√		Halfway Inn currently operating. An application on file for eco-tourist facility.			√	⇔	
Road Access	√		258 km. Highway 108 and numerous forest roads (9) access the protected area. Highway 108 crosses the protected area for 13 km. A network of about 30 km of forest roads exist in the protected area (providing seasonal access); also a large network of trails in northwest corner of protected area; a main snowmobile trail runs south to north through the area on an existing logging road; no other groomed snowmobile or ATV trails; no road access for most areas (not even snowmobile trails).					Road density: 0.90 km/km2
Transmission Lines								

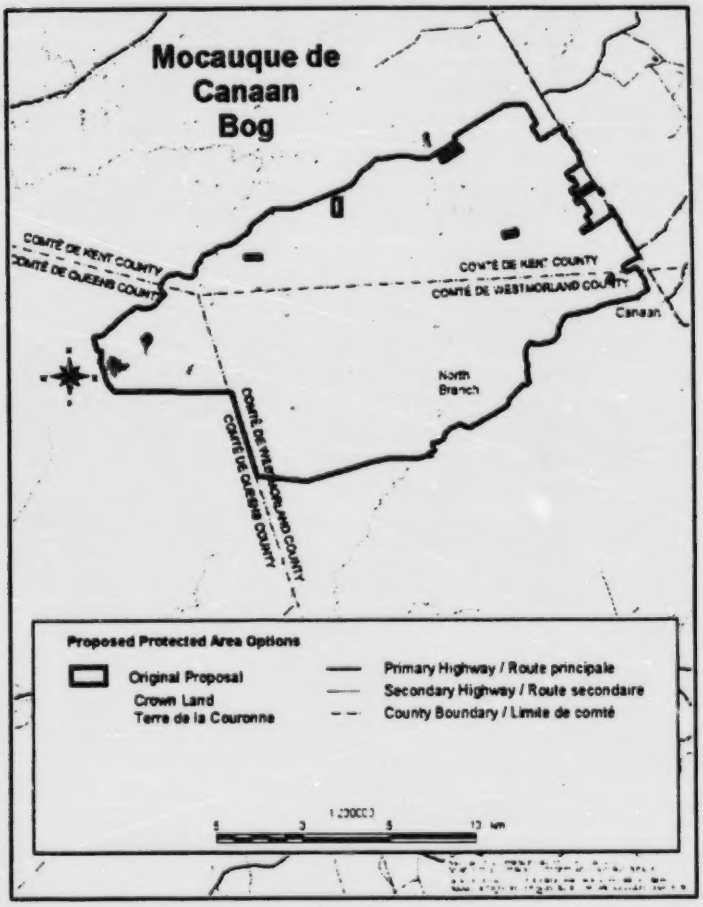
H = High
M = Moderate
L = Low

Socio-Economic Activity Evaluation Criteria								
Significance to total activity in province					Economic Value (1)			
	H	M	L	Comment	H	M	L	Actual Estimate
Mineral: Mines/Peat Opers.								
Known Occurrences			√				√	
Exploration/ Claimstaking			√				√	
Forestry: Logging	√			About 22% of loss attributable to all Protected Areas.	√			Total Direct and Indirect Employment: 120 jobs Income: $4.0 million
Wildlife: Hunting: Big Game			√	Better for moose and bear than deer.				Total Direct and Indirect Employment: 1 job Income: $25,000
Small Game			√				√	
Waterfowl			√				√	
Trapping		√					√	
Sport Fishing								Total Direct and Indirect Employment: 2 jobs Income: $44,000
Recreation (Non-consumptive): Camps			√				√	
Snowmobile		√		Not on a main provincial trail.			√	
ATV			√	Not near major population centres.			√	
Camping/Hiking			√				√	
Canoeing			√				√	
Commercial Tourism/ Outfitter			√				√	
Road Access								
Transmission Lines								

(1) Blank cells indicate no estimate available at the PA level.

Notes - Canaan Bog

Map 5 - Canaan Bog



Canaan Bog – Main Characteristics

Natural

The Canaan Bog area captures a highland bog complex that represents the higher elevation inland areas within the eastern lowlands eco-region.

Location and Economy

This proposed Protected Area is 36,900 ha, it is not located near major population centres. Bouctouche is the closest at nearly 40 km. Moncton is about the same distance. The local economy is rural in nature with the local peat operation being one of the major employers.

Mineral Potential

The proposed Protected Area is the host to an active and expanding peat operation. They currently operate in two bogs. There are also two additional bogs in the area that have options for development. Two other bogs are also considered to have development potential. Aside from peat there are no other known mineral occurrences. Part of the area is licensed for oil and gas exploration.

Forestry Potential

Over 9,000 ha of harvest blocks are scheduled for next 25 years. The Canaan Bog accounts for about 20 percent of the total wood supply in the eight Protected Areas. It is located in two Crown Licenses 6 and 7. Major processing facilities supported by these licenses include[7]:

License 6
Licensee – J. D. Irving Ltd.
Sub-Licensees – 31
License 7
Licensee – Irving Pulp and Paper Ltd.
Sub-Licensees – 21

Recreation

- Important deer hunting area that accounts for about one percent of all deer harvested in province. Many hunters travel from northern part of province to hunt in this area. A lot of hunting occurs along roadways. About 30 bear licenses are used by outfitters in the area.
- Some, but not a lot, of sport fishing does take place.
- A cluster of camps in north east corner are used for hunting and fishing.

[7] All sub-licensees are listed in Schedule F presented in the forestry appendix – Appendix 2.

Canaan Bog – The Natural and Socio-Economic Features of the Region Surrounding the Protected Area

Variable	Indicator
Natural Features	
Eco-region	Eastern Lowlands (6)
Geological zone	Maritimes basin terane
Socio-Economic Features	
Population of nearby communities	Rogersville – 1,427 (50 km) Moncton – 59,313 (city)/113,491 (agglomeration) (30 km) Petitcodiac – 1,425 (55 km) Bouctouche – 2,459 (40 km)
Major roads nearby	About 10 km north of Highway 112 and about 10 km south of Highway 116; Highway 126 skirts eastern side. Abandoned CNR line crosses southern edge; other CNR line skirts northeast side.
Economic Features	
Economic base	Resource base: forestry, minerals (oil and natural gas licenses, peat), services, recreation. Moncton is service-oriented with busy industrial parks and extensive call centre operations; it is a major retail centre and transportation/distribution hub; in 1995 the Moncton area had a total of 29 firms in the logging industry and 28 firms in the forestry related manufacturing firms. Moncton, Petitcodiac, and Bouctouche each have one wood processing company; Rogersville has two firewood companies (NBFPA).
Employment/unemployment	Unemployment rate is about the same as the provincial average; the percentage of people in Moncton working in primary industries and secondary industries is lower than the provincial average.
Proximity to other major tourism/recreation resource	Bouctouche (eco-tourism and Le Pays de la Sagouine) (40 km). Kouchibouguac National Park (60 km). Fundy National Park (95 km).
Adjacent Land Tenure	Crown land surrounds Protected Area except for northeast side where there is private land.

Canaan Bog – Socio-Economic Activities that Take Place in the Proposed Protected Area

Socio-Economic Activity Evaluation Criteria								
	Is the Activity Present?			Intensity of Activity				
	Yes	No	Comment	H	M	L	Trend	Comment
Mineral:								
Mines/Peat Opers.	√			√			⇑	
Known Occurrences	√		Only two.			√	⇓	No metallic potential
Exploration/ Claimstaking	√		Limited staking history. Current activity related to oil and gas.		√		⇑	15,000 ha - under license
Forestry:								
Logging	√		9,131 ha of harvest blocks in next 25 years.	√				AAC-36,337 m3/yr
Wildlife:								
Hunting:								
Big Game	√		Deer, moose and bear.	√			⇔	Almost 1% of total deer in province. Lots of hunting along road system
Small Game	√					√	⇔	
Waterfowl		√	Minor activity.			√	⇓	
Trapping	√		Game management area limits trapping opportunity.			√	⇓	Low prices
Sport Fishing	√					√		
Recreation (Non-Consumptive):								
Camps	√		Not many in area but 30-40 located outside NE corner.		√		⇔	Mainly used for hunting and fishing.
Snowmobile	√		Powerline groomed trail.		√		⇑	
ATV	√			√			⇑	
Camping/Hiking		√						
Canoeing	√		On Canaan River on SE boundary.			√		
Commercial Tourism		√						
Road Access			Numerous forest roads provide access to the protected area; natural gas pipeline follows part of southern boundary and is accessed by forest roads; another forest road follows large section of northern boundary. A network of about 45 km of forest roads exist in the protected area (providing seasonal access); many poor roads concentrated in southern section; CNR line crosses protected area (12 km); power transmission line (not shown on map) serves as groomed snowmobile trail.		√			Road density: 0.47 km/km2.
Transmission Lines/ Pipeline	√							

H = High
M = Moderate
L = Low

Socio-Economic Activity Evaluation Criteria								
Significance to total activity in province					Economic Value (1)			
	H	M	L	Comment	H	M	L	Actual Estimate
Mineral:								
Mines/Peat Opers.	√				√			About 30 seasonal jobs.
Known Occurrences			√				√	
Exploration/ Claimstaking		√		Part of major airborne program scheduled for southern NB this summer for oil and gas license.				
Forestry:								
Logging	√			About 17% of the loss attributable to all Protected Areas.				Total Direct and Indirect Employment: 98 jobs Income: $3.2 million
Wildlife:								
Hunting:								
Big Game	√			Many hunters come from northern part of province. Also, local hunters. Major car road is heavily hunted.	√			Total Direct and Indirect Employment: 5 jobs Income: $130,000
Small Game			√				√	
Waterfowl			√				√	
Trapping			√	Result of large game Protected Area.				
Sport Fishing			√				√	Total Direct and Indirect Employment: <1 job Income: $9,000
Recreation (Non-Consumptive):								
Camps			√				√	
Snowmobile		√					√	
ATV		√					√	
Camping/Hiking								
Canoeing			√				√	
Commercial Tourism								
Road Access								
Transmission Lines/ Pipeline								

(1) Blank cells indicate no estimate available at the PA level.

Notes - Grand Lake Meadows

Map 6 - Grand Lake Meadows

Grand Lake Meadows – Main Characteristics

Natural

The proposed Grand Lake Meadows site captures the river valley bottomland and the upland features of a portion of the Saint John River Valley. The main features of this site vary from wetland meadows and alluvial floodplains to upland forests. The site also contains the province's largest wetland.

Location and Economy

This Protected Area is 16,800 ha and is located within about 15 km of Fredericton. The economy in this area is mainly service oriented with a few wood processing facilities. Fredericton is the base for several important forest industry support activities including university and government services.

Mineral Potential

The area has virtually no known mineral occurrences. There are some peat resources although none are expected to be developed in the near term. Bull Pasture is unavailable to commercial exploitation. Part of the area is subject to an oil and gas exploration license. Overall, the area is considered to have low mineral industry potential.

Forestry Potential

About 7,500 ha of harvest blocks are scheduled for next 25 years. The area contains about 10% of the total wood supply in the eight Protected Areas. It is located in Crown License 7. Major processing facilities supported by this license include[9].

License 7
Licensee – Irving Pulp and Paper Ltd.
Sub-Licensees – 21

Recreation

This Protected Area provides significant habitat for waterfowl. The area has had major waterfowl habitat improvement projects conducted by Ducks Unlimited and the Eastern Habitat Joint Venture. Significant waterfowl hunting occurs in the lower portion of the area in the wetland meadows and floodplains. Other recreation uses include:

- High camp use in northeast portion.
- Important big game habitat but hunting is limited due to migration patterns.
- Wildlife viewing popular along roadways.
- Considerable snowmobiling and ATV use, with a great increase in ATV activity.

[9] All sub-licensees are listed in Schedule F presented in the forestry appendix – Appendix 2.

Grand Lake Meadow – The Natural and Socio-Economic Features of the Region Surrounding the Protected Area

Variable	Indicator
Natural Features	Protected Area is divided into two main sections that are not connected.
Eco-region	Eastern Lowlands (6) and Grand Lake Basin (7).
Geological zone	Maritimes Basin terane.
Socio-Economic Features	
Population of nearby communities	Fredericton – 46,507 (city)/78,950 agglomeration (15 km). Oromocto – 9,194 (20 km). Gagetown – 660 (10 km). Minto – 3,056 (15 km). Chipman – 1,518 (60 km).
Major roads nearby	About 10 km east of Highway 8; Highway 10 crosses Protected Area (17 km); southern section nearly borders Highway 2 and this highway crosses it (1 km)
Economic Features Economic base	Resource base: forestry, services, recreation, minerals (oil and gas licenses). Economy of Fredericton is predominantly service-oriented led by government, educational and health care institutions; government and educational sectors involve extensive forestry related operations (e.g., CFS, DNRE, Maritime Forest Ranger School, UNB Forestry Faculty). Fredericton has 2 wood processing companies (NBFPA), several sawmills, trucking firms specializing in transportation of forest products, many woodworking establishments supplying and servicing forestry equipment and forestry consulting services firms; surrounding communities around Fredericton also include intensive forest activities (e.g. pulp mill in Nackawic, several sawmills in Chipman area, wood pressure treating plant in Tracyville, and veneer plant in Napadogan). Canadian Forces Base Gagetown employs 3,300 military and 900 civilian.
Employment/unemployment	Unemployment rate is below provincial average; the percentage of people in Fredericton working in primary industries is lower than the provincial average, and the percentage of people working in secondary industries is lower than the provincial average.
Proximity to other major tourism/recreation resource	Grand Lake (boating). Saint John River (boating). Sport fishing in French Lake area. Kings Landing Historical Settlement (60 km).
Adjacent Land Tenure	Crown land on north side of northern section; Burpee Game Management Area and UNB Forest on south side of northern section; Acadia Research Forest owned by Natural Resources Canada is to the south; private land borders Game Management Area. Private land surrounds southern section; southern section is in pieces mixed with private land holdings.

Grand Lake Meadows – Socio-Economic Activities that Take Place in the Proposed Protected Area

Socio-Economic Activity Evaluation Criteria								
	Is the Activity Present?			Intensity of Activity				
	Yes	No	Comment	H	M	L	Trend	Comment
Mineral: Mines/Peat Opers.		√				√	⇩	No mines identified. Peat resource not of commercial interest. Bull Pasture is not available.
Known Occurrences		√				√		
Exploration/ Claimstaking	√		Limited staking history. Active license related to explore oil and gas.		√		⇧	Only exploration is related to oil and gas 5,875 ha.
Forestry: Logging	√		7,575 ha of harvest blocks in next 25 years.				⇔	AAC-24,405 m3/yr
Wildlife: Hunting: Big Game	√		Deer, moose and bear.	√			⇔	Good road access located close major population centre.
Small Game	√				√		⇔	
Waterfowl	√		Location of major waterfowl habitat.	√			⇔	Important area although overall # of hunters decreasing.
Trapping	√		Less than 10 trappers.			√	⇩	Fur prices low.
Sport Fishing	√							
Recreation (Non-consumptive): Camps	√		Camps in PA and on private land in NE section.	√			⇧	High in NE area only.
Snowmobile	√		Former rail bed is a groomed trail. Forest roads and transmission line.	√			⇧	
ATV	√			√			⇧	Heavy use of roads, and frozen lakes and rivers.
Camping/Hiking		√	High mosquito density.					
Canoeing	√		Little River used in May, June.					
Nature viewing	√		Wildlife viewing from automobiles, Bull Pasture bog has many flowers and plants.		√		⇔	
Commercial Tourism	√		Some bear outfitting.			√	⇔	
Road Access			Numerous forest roads (8) and highways 10 and 2 provide access to protected area. A network of about 40 km of forest roads exist in the protected area (providing seasonal access): few poor roads in northern section; no other roads besides Highway 2 in southern section; transmission lines cross protected area (30 km).					Road density: 0.35 km/km2
Transmission Lines	√							
Watershed		√						

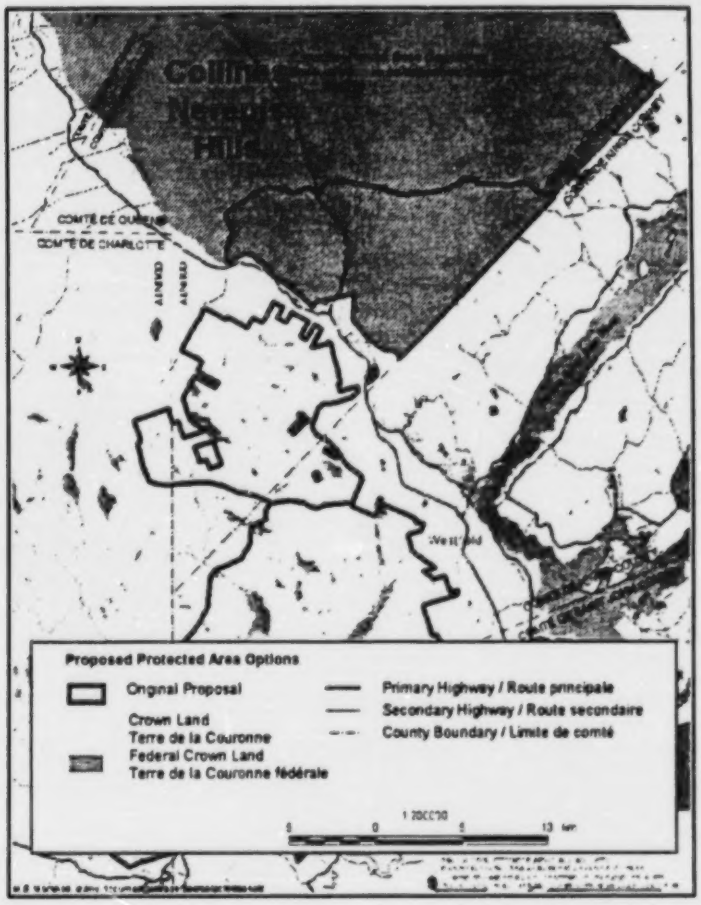
H = High
M = Moderate
L = Low

Socio-Economic Activity Evaluation Criteria								
Significance to total activity in province					Economic Value (1)			
	H	M	L	Comment	H	M	L	Actual Estimate
Mineral: Mines/Peat Opers.			√					
Known Occurrences			√					
Exploration/ Claimstaking	√			Major airborne program planned this summer. PA is only part of area to be surveyed.	√			
Forestry: Logging		√		About 12% of total the loss attributable to all areas.		√		Total Direct and Indirect Employment: 65 jobs Income: $2.2 million
Wildlife: Hunting: Big Game	√			Important deer and moose habitat in winter to south but not heavily hunted.			√	Total Direct and Indirect Employment: 2 jobs Income: $45,000
Small Game		√					√	
Waterfowl	√			Location of major habitat restoration projects, probably most intense hunting in all inland parts of province.	√			
Trapping			√				√	
Sport Fishing			√				√	Total Direct and Indirect Employment: 1 job Income: $15,000
Recreation (Non-consumptive): Camps		√						
Snowmobile	√			Part of provincial trail system. Significant local use due to proximity to population centres.				
ATV	√							
Camping/Hiking								
Canoeing			√					
Nature viewing				Deer migration is attraction.				
Commercial Tourism			√				√	
Road Access								
Transmission Lines								
Watershed								

(1) Blank cells indicate no estimate available at the PA level.

Notes - Nerepis Hills

Map 7 - Nerepis Hills


Proposed Protected Area Options
Original Proposal
Crown Land
Terre de la Couronne
Federal Crown Land
Terre de la Couronne fédérale
Primary Highway / Route principale
Secondary Highway / Route secondaire
County Boundary / Limite de comté

Nerepis Hills – Main Characteristics

Natural

The Nerepis Hills site captures three distinct landscape types. The southern half is characterized by rolling hills and lakes. The northeastern portion contains the higher elevations, Nerepis Hills. The northwestern portion contains the valleys of the Nerepis River and the Douglas Valley Brook.

Location and Economy

This Protected Area is 20,100 ha and is located within about 35 km of Saint John. Other nearby communities are small. The immediate local economy is rural. The City of Saint John is a major service centre with important wood processing facilities.

Mineral Potential

Part of this Protected Area is of current interest to the exploration industry. The interest is driven by the recent geological mapping and mineral discoveries. These have resulted in the belief that there is potential for economic concentrations of tin, gold and base-metal sulfides to exist in the contact with the Saint George Batholith. There has also been interest at Square Lake in the exploration for tin and tungsten. Potential for mineral development in this Protected Area is higher than for most of the other areas.

Forestry Potential

About 3,500 ha of harvest blocks are scheduled for next 25 years. Nerepis Hills contains about 5% of the total wood supply in the eight Protected Areas. It is located in Crown License 7. Major processing facilities supported by this license include[9]:

License 7
Licensee – Irving Pulp and Paper Ltd.
Sub-Licensees – 21

Recreation

- A lot of hunting for deer; good moose and bear hunting are also available.
- Important area for bear outfitters.
- Some hiking on the southern part of the Gagetown property.
- Considerable ATV use. Snowmobiles are active but they have a short season compared with the north.

[9] All sub-licensees are listed in Schedule F presented in the forestry appendix – Appendix 2.

Nerepis Hills – The Natural and Socio-Economic Features of the Region Surrounding the Protected Area

Variable	Indicator
Natural Features	Protected Area is divided into two sections (northern and southern sections) which are not connected; separated by Nerepis River and Highway 7
Eco-region	Continental Lowlands (5)
Geological zone	St. Croix and Mascarene teranes
Socio-Economic Features	
Population of nearby communities	Gagetown – 660 (45 km) Westfield – 1,167 (15 km) Fredericton Junction – 736 (30 km) Saint John (Metro area) – 125,705 (35 km)
Major road nearby	Highway 7 crosses northern section of Protected Area (7 km); Highway 101 skirts south west side of northern section and is a few km east of southern section
Economic Features Economic base	Resource base: forestry, industry, services, recreation, tourism, fishing Saint John is a commercial and manufacturing centre (shipbuilding, industry, refinery, pulp and paper), and a year-round seaport and rail terminus; tourism, commercial fishing and the building and repairing of ships are also important to its economic base; major employers in Saint John include Saint John Regional Hospital, Saint John Shipbuilding, J.D. Irving Limited, Irving Paper Inc., Irving Pulp & Paper Ltd., Irving Oil Ltd. Refining Division Saint John has 7 wood processing companies and Fredericton Junction has one wood processing company (NBFPA)
Employment/unemployment	Unemployment rate is below provincial average; the percentage of people in Saint John working in primary industries is lower than the provincial average, and the percentage of people working in secondary industries is the same as the provincial average
Proximity to other major tourism/recreation resource	Fundy National Park (160 km) Bay of Fundy (beaches) (30 km) Saint John River (beaches, boating) (10 km)
Adjacent Land Tenure	Protected Area is divided into two main sections. To the north, lands owed by CFB Gagetown are included, the area adjacent to this is additional Gagetown's lands and other private land. The north section is separated from the south section by private land. For the south section, Crown land is on southwest edge; Loch Alva Protected Area is adjacent to south edge. Private land to north of Protected Area

Nerepis Hills – Socio-Economic Activities that Take Place in the Proposed Protected Area

Socio-Economic Activity Evaluation Criteria								
	Is the Activity Present?			Intensity of Activity				
	Yes	No	Comment	H	M	L	Trend	Comment
Mineral: Mines/Peat Opers.		√	No operations.			√		
Known Occurrences	√		Four occurrences.			√	⇔	
Exploration/ Claimstaking	√		Current staking occurring in areas adjacent to Protected Area.		√		⇑	Significant interest in southeast portion. New gold occurrence in similar environment elsewhere has spurred interest.
Forestry: Logging	√		3,507ha of harvest blocks next 25 years.					AAC-10,496 m3/yr
Wildlife: Hunting: Big Game	√		Deer, moose and bear.		√		⇔	More moose than deer by habitat but moose season only 3 days.
Small Game	√					√	⇔	
Waterfowl		√				√	⇔	
Trapping	√		63 trapping permits available in Gagetown portion.		√		⇓	
Sport Fishing	√					√		
Recreation (Non-consumptive): Camps	√		14 camps			√		
Snowmobile	√		Hydroline and forest roads – also have trail under construction.				⇓	
ATV	√			√			⇑	High use
Camping/Boating	√					√		
Canoeing/Hiking	√		Hiking in southern part of Gagetown section.		√		⇑	Near cliffs
Commercial Tourism/ Outfitter	√		Mainly outfitting with some day use.			√		
Road Access	√		128 km. Highway 7 and numerous (10) forest roads access northern section; fewer (7) forest roads access southern section. Networks of about 60 km and 25 km of forest roads exist in the northern section and southern section of the protected area, respectively (providing seasonal access). Few poor roads in both sections. Transmission line crosses southern section (5 km). Number of camps (13) near lakes.		√			Road density: 0.64 km/km2
Transmission Lines	√							
Water Supply	√		Part of Musquash water system that supplies City of Saint John. This water supply is also found in Loch Alva.					

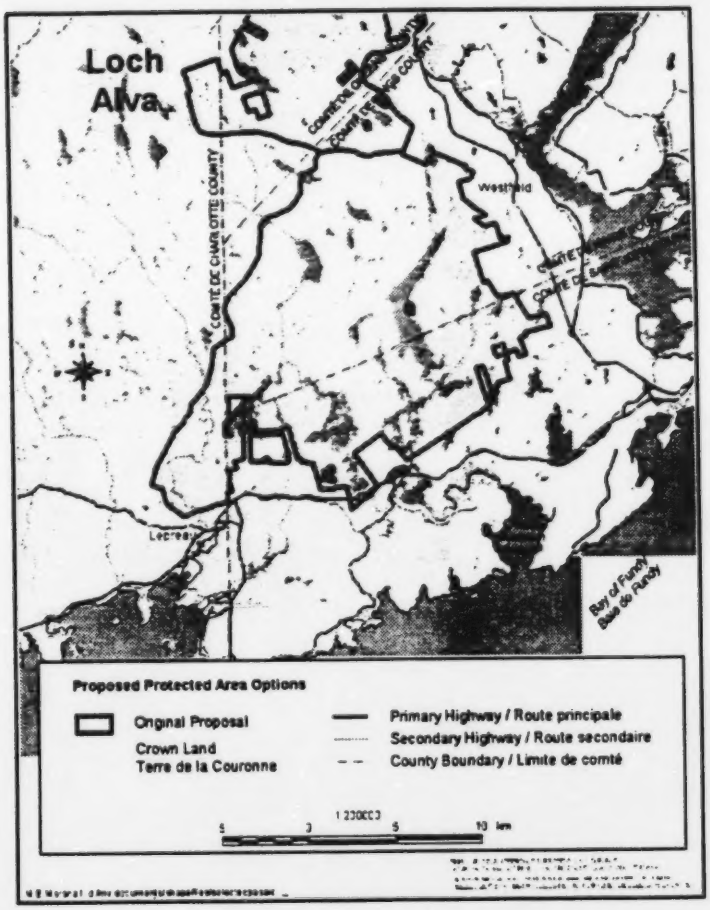
H = High
M = Moderate
L = Low

Socio-Economic Activity Evaluation Criteria								
Significance to total activity in province					Economic Value (1)			
	H	M	L	Comment	H	M	L	Actual Estimate
Mineral:								
Mines/Peat Opers.			√				√	
Known Occurrences			√				√	
Exploration/ Claimstaking		√		Gold in similar environment at Rolling Dam.			√	$60,000 in area over next five years.
Forestry:								
Logging			√	About 5% of total loss attributable to all Protected Areas.			√	Total Direct and Indirect Employment: 27 jobs Income: $.9 million
Wildlife:								
Hunting:								
Big Game		√		Mainly local hunters.			√	Total Direct and Indirect Employment: 3 jobs Income: $65,000
Small Game			√				√	
Waterfowl			√				√	
Trapping		√				√		
Sport Fishing			√				√	Total Direct and Indirect Employment: 1 job Income: $15,000
Recreation (Non-consumptive):								
Camps			√					
Snowmobile								
ATV	√			Similar to other areas in vicinity.				
Camping/Boating								
Canoeing/Hiking		√		Great increase in past 3-4 years, people from Saint John.				
Commercial Tourism/ Outfitter			√				√	
Road Access								
Transmission Lines								
Water Supply								

(1) Blank cells indicate no estimate available at the PA level.

Notes - Loch Alva

Map 8 - Loch Alva



Loch Alva - Main Characteristics

Natural

The proposed Loch Alva site captures the valley and ridge features, which are typical of the Continental Lowlands, as well as the low coastal hills of the Fundy Coastal Ecoregion. During the public consultation, the area was identified as having exceptional wilderness opportunities.

Location and Economy

The site is 26,400 ha and is located near the metro area of Saint John which explains its high use as a recreation area. The local economy is diverse with a large service sector and several wood processing facilities.

Mineral Potential

The area has few recorded mineral occurrences, the most significant of which is at Eagle Lake. The potential for further mineral development is low.

Forestry Potential

Almost 8,000 ha of harvest blocks are scheduled over next 25 years. The area contains almost 15% of the wood supply in all eight Protected Areas. It is located in Crown License 7. Major processing facilities supported by this license include[10]:

License 7
Licensee – Irving Pulp and Paper Ltd.
Sub-Licensees – 21

Recreation

Loch Alva is intensely used (compared with other PAs) for wilderness recreation opportunities.

- It has 150 camp leases.
- It accounts for 20-25% of all game harvested in the proposed Protected Areas.
- Considerable sport fishing does occur.
- Boating on Loch Alva popular.
- Commercial outfitters do operate in the area, mainly for bear.
- Snowmobile activity is declining but there is a great increase in ATV activity.

[10] All sub-licensees are listed in Schedule F presented in the forestry appendix – Appendix 2.

Loch Alva – The Natural and Socio-Economic Features of the Region Surrounding the Protected Area

Variable	Indicator
Natural Features	
Eco-region	Continental Lowlands (5) and Fundy Coastal (4)
Geological zone	Caledonia Zone and Mascarene teranes
Socio-Economic Features	
Population of nearby communities	Fredericton Junction – 736 (35 km) Grand Bay – 3,713 (<5 km) Westfield – 1,167 (<5 km) Saint John (Metro area) – 125,705 (20 km)
Major roads nearby	A few km north of Highway 1 and a few km west of Highway 7; these two highways skirt the south and east sides of the Protected Area.
Economic Features	
Economic base	Resource base: forestry, industry, services, tourism, fishing. Saint John is a commercial and manufacturing centre (shipbuilding, industry, refinery, pulp and paper), and a year-round seaport and rail terminus; tourism, commercial fishing and the building and repairing of ships are also important to its economic base; major employers in Saint John include Saint John Regional Hospital, Saint John Shipbuilding, J.D. Irving Limited, Irving Paper Inc., Irving Pulp & Paper Ltd., Irving Oil Ltd. Refining Division. Saint John has 7 wood processing companies and Fredericton Junction has 1 wood processing company (NBFPA).
Employment/unemployment	Unemployment rate is below provincial average; the percentage of people in Saint John working in primary industries is lower than the provincial average, and the percentage of people working in secondary industries is the same as the provincial average.
Proximity to other major tourism/recreation resource	Fundy National Park (140 km) Grand Manaan Island (65 km) Roosevelt Campobello International Park Saint John River (beaches, boating) (10 km) Reversing Falls in Saint John (20 km) Bay of Fundy (beaches) (10 km)
Adjacent Land Tenure	Crown land on north and west sides; Nerepis Hills are to north of Protected Area. There is private land on south and east sides of Protected Area.

Loch Alva – Socio-Economic Activities that Take Place in the Proposed Protected Area

Socio-Economic Activity Evaluation Criteria								
	Is the Activity Present?			Intensity of Activity				
	Yes	No	Comment	H	M	L	Trend	Comment
Mineral: Mines/Peat Opers.		√						
Known Occurrences	√		Few recorded in PA, but area is surrounded by intensely mineralized rock.			√	⇔	Eagle Lake occurrence most important-copper, molybdenum and silver.
Exploration/ Claimstaking		√	Some staking in past around Eagle Lake.			√	⇓	
Forestry: Logging	√		7,716 ha of harvest blocks next 25 years.		√		⇔	AAC-27,845 m3/yr.
Wildlife: Hunting: Big Game	√		Deer, moose and bear.	√			⇔	The number of camps, proximity to major population centre & quality of resource are important factors.
Small Game	√			√			⇔	Due to camps
Waterfowl	√					√	⇔	Although not major area, # of camps dictate that the activity would take place.
Trapping	√				√			
Sport Fishing	√		Important aspect of recreation use.	√				
Recreation (Non-consumptive): Camps	√		More than 150 leased campsites.	√			⇔	Heavily used.
Snowmobile	√		Hydroline used extensively and forest roads, 2/3 of camps used in winter.		√		⇓	Losing to ATVs and poor winter conditions.
ATV	√		Many trails and roads-areas that used to be accessible only by float plane now accessed by ATVs.	√			⇑	Camps and adjacent to major populations.
Camping/Boating	√		Access to Loch Alva by boat only, several good sandy beaches that see a lot of camping activity.		√		⇔	
Canoeing/Hiking	√		Limited, day hiking to Turtle Mountain.				⇔	
Commercial Tourism/ Outfitter	√		Bear, moose, deer	√			⇑	
Road Access	√		116 km of forest road Numerous forest roads (>10) provide access to the protected area. Two transmission lines crossing protected area for 11 km and 17 km are used by ATVs and snowmobiles. A network of about 50 km of rough forest roads and trails exist in the protected area providing seasonal access. They are used intensively by ATVs and hikers.		√			Road density: 0.44 km/km2
Transmission Lines	√		Hydroline					
Water Supply	√		Saint John water supply					

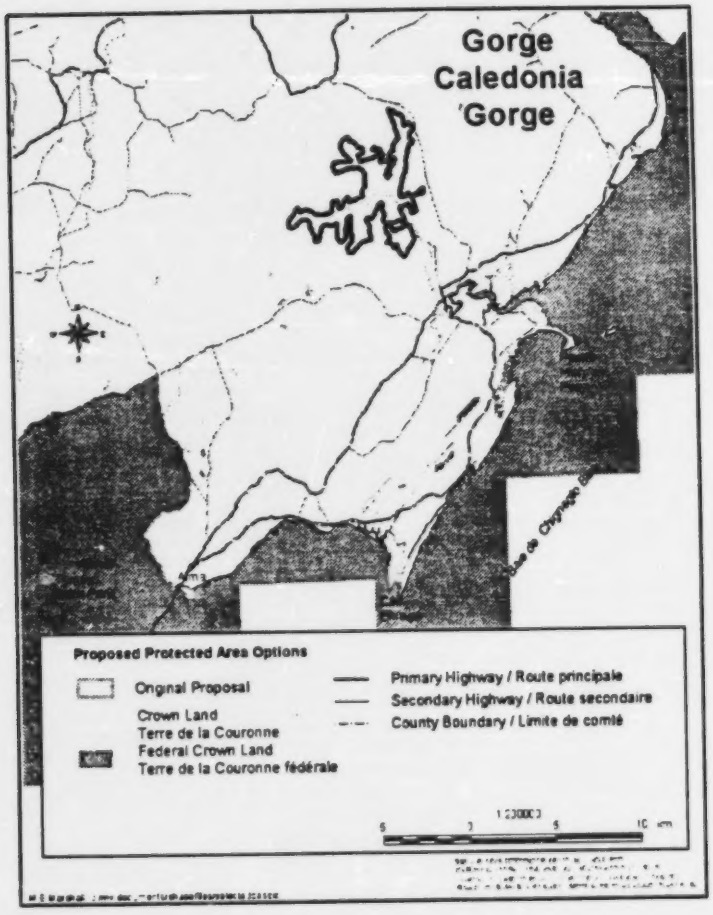
H = High
M = Moderate
L = Low

Socio-Economic Activity Evaluation Criteria								
Significance to total activity in province					Economic Value (1)			
	H	M	L	Comment	H	M	L	Actual Estimate
Mineral: Mines/Peat Opers.								
Known Occurrences			√				√	
Exploration/ Claimstaking			√				√	
Forestry: Logging		√		About 13% of total loss attributable of all Protected Areas.		√		Total Direct and Indirect Employment: 76 jobs Income: $2.5 million
Wildlife: Hunting: Big Game	√			25% of deer in all Pas; 20% of moose; 25% of bear.	√			Total Direct and Indirect Employment: 3 jobs Income: $85,469
Small Game		√					√	
Waterfowl			√	Not a major waterfowl area.			√	
Trapping		√				√		
Sport Fishing	√				√			Total Direct and Indirect Employment: 2 jobs Income: $38,000
Recreation (Non-consumptive): Camps	√				√			
Snowmobile			√	Not the best of natural conditions			√	
ATV	√							
Camping/Boating			√				√	
Canoeing/Hiking			√				√	
Commercial Tourism/ Outfitter	√				√			
Road Access								
Transmission Lines								
Water Supply								

(1) Blank cells indicate no estimate available at the PA level.

Notes - Caledonia Gorge

Map 9 - Caledonia Gorge



Caledonia Gorge – Main Characteristics

Natural

The Caledonia Gorge is a representative example of river gorges that are typical of the steep sloping areas of the Fundy Plateau portion of the Southern Uplands Eco-region.

Location and Economy

It is 2,000 ha and is located near Riverside Albert in Albert County. Most communities nearby are quite small. Moncton is about 40 km away. The economy in the immediate vicinity is very rural based with significant tourism activity associated with Hopewell Rocks and Fundy Park.

Mineral Potential

The mineral industry has been active historically in the general area. However, there are few known mineral occurrences and those that do exist lie to the west of and uphill from the Protected Area. There is no current claim staking activity. The potential for development in the future is limited.

Forestry Potential

About 300 ha of harvest blocks are scheduled for next 25 years. The area contains less than one percent of the total wood supply in the eight Protected Areas. It is located in Crown License 7. Major processing facilities supported by this license include[11]:

License 7
Licensee – Irving Pulp and Paper Ltd.
Sub-Licensees – 21

Recreation

- Limited hunting and outfitting because of steep slopes of gorge.
- Some low level sport fishing does occur.
- There is camping, hiking and scenic viewing as look outs have been developed. Fall foliage is reported as quite spectacular.
- There are major snowmobile trails and facilities nearby. ATV use is increasing.

[11] All sub-licensees are listed in Schedule F presented in the forestry appendix – Appendix 2.

Caledonia Gorge – The Natural and Socio-Economic Features of the Region Surrounding the Protected Area

Variable	Indicator
Natural Features	
Eco-region	Southern Uplands (3)
Geological zone	Caledonia Zone terane
Socio-Economic Features	
Population of nearby communities	Riverside-Albert – 415 (4 km) Moncton – 59,313 (city)/113,491 (agglomeration) (40 km) Petitcodiac – 1,425 (40 km) Hillsborough – 1,272 (25 km)
Major roads nearby	About 5 km north of Highway 114
Economic Features	
Economic base	Resource base: services, recreation, tourism, forestry. Moncton is service-oriented with busy industrial parks and extensive call centre operations; it is a major retail centre and transportation/distribution hub; in 1995 the Moncton area had a total of 29 firms in the logging industry and 28 firms in the forestry related manufacturing firms. Moncton and Petitcodiac each have one wood processing company (NBFPA).
Employment/unemployment	The unemployment rate is the same as the provincial average; the percentage of people in Moncton working in primary industries and secondary industries is lower than the provincial average.
Proximity to other major tourism/recreation resource	Close to Fundy Tidal Exploration Zone Riverside-Albert Fundy Historic Village and Crooked Creek Hiking Trail and viewing tower (4 km) Magnetic Hill Complex (40 km) Fundy National Park (32 km) Hopewell Rocks (20 km) Cape Enrage Adventure Challenge Site (30 km)
Adjacent Land Tenure	On the west side of Protected Area is mostly Crown land. There is private land on the south, north and eastern sides of Protected Area.

Caledonia Gorge – Socio-Economic Activities that Take Place in the Proposed Protected Area

Socio-Economic Activity Evaluation Criteria								
	Is the Activity Present?			Intensity of Activity				
	Yes	No	Comment	H	M	L	Trend	Comment
Mineral: Mines/Peat Opers.		√	A zinc, silver and copper development operated near area in early part of century.			√	⇔	
Known Occurrences		√	None in the immediate area, although several lie to west and uphill.			√	⇔	
Exploration/ Claimstaking		√	No current activity.				⇔	
Forestry: Logging	√		303 ha of harvest blocks next 25 years. Much of area is inoperable due to steep slopes.			√	⇔	AAC-920 m3/yr
Wildlife: Hunting: Big Game	√		Moose, deer and bear.			√	⇔	Because of steep slopes it is difficult area to hunt.
Small Game	√		Mainly bird hunting.		√			
Waterfowl		√						
Trapping	√		Historically there has been some			√	⇓	Low prices
Sport Fishing	√							
Recreation (Non-consumptive): Camps		√	No camps located in PA. Some situated outside.					
Snowmobile	√		Forest roads used to access lookouts.	√			⇓	Warm up hut just to north of PA on a main line groomed trail.
ATV	√		Forest roads used.	√			⇑	
Camping/Hiking	√		Several local people camp near Crooked Creek; scenic viewing and hiking.			√	⇔	
Canoeing	√		On Crooked Creek			√		
Commercial Tourism	√		Tourists to lookouts; some outfitting.		√		⇑	Crooked Creek promoted for hiking & scenery outfitting.
Road Access			3 km of forest road One forest road provides access on the southeast side. A few poor roads also access the area. One forest road (3 km) exists in the protected area (providing seasonal access). There are no other roads of any kind in the protected area, but there is an extensive network of trails for mountain biking, hiking, snowmobiles (Southeastern New Brunswick Snowmobile Club), ATVs intensively used.			√		Road density: 0.15 km/km2
Transmission Lines		√						

H = High
M = Moderate
L = Low

Socio-Economic Activity Evaluation Criteria								
Significance to total activity in province					Economic Value (1)			
	H	M	L	Comment	H	M	L	Actual Estimate
Mineral: Mines/Peat Opers.			√				√	
Known Occurrences			√				√	
Exploration/ Claimstaking			√				√	$20,000 in area over next five years.
Forestry: Logging			√	Less than 1% of loss attributable to all Protected Areas.			√	Total Direct and Indirect Employment: 5 jobs Income: $.18 million
Wildlife: Hunting: Big Game			√	There is a lot of hunting in vicinity but not in the PA.			√	Total Direct and Indirect Employment: <1 job Income: $5,700
Small Game		√					√	
Waterfowl								
Trapping			√				√	
Sport Fishing			√				√	Total Direct and Indirect Employment: <1 job Income: $12,000
Recreation (Non-consumptive): Camps								
Snowmobile			√	Main trails outside PA.			√	
ATV			√				√	
Camping/Hiking			√				√	
Canoeing			√				√	
Commercial Tourism			√	Located close to Fundy Park and Hopewell Rocks. Both receive intense tourism activity compared with PA.			√	
Road Access								
Transmission Lines								

(1) Blank cells indicate no estimate available at the PA level.

3.0 IMPACT ANALYSIS

In this report, the impacts of protection for the eight proposed Protected Areas (see *"A Protected Areas Strategy for New Brunswick"* 1999 by Dr. Louis LaPierre) are identified and classified as benefits or costs. Benefits refer to those impacts that represent incremental gains in socio-economic activity or improvements in economic welfare for residents of New Brunswick. Costs refers to those impacts that either involve a cash (budgetary) cost associated with implementing or operating the Protected Areas or an opportunity cost, where the economic benefits of some excluded activity must be given up.

Care is taken to distinguish between benefits or costs that are incremental as opposed to just a redistribution of activity. Incremental refers to situations where there is a net gain (benefit) or net loss (cost). Redistribution refers to situations where the apparent benefit or cost associated with a PA is offset by an equal cost or benefit, respectively, that occurs outside the PA. For example, if hunting were excluded from a Protected Area but hunters could replace the lost hunting opportunities with alternative sites outside the area, the losses associated with protection are exactly offset by the gains associated with hunting outside the area. Note that even if the hunting could not be replaced directly, the New Brunswick economy may not suffer a loss if the money spent on hunting is redistributed to other types of recreation in the province. This too is a form of redistribution of economic activity that results in no net gain or loss at the provincial level.

3.1 Benefits

3.1.1 Biodiversity+

We start the analysis of the impacts (benefits and costs) with a review of the concept of biodiversity. This is because it is the foundation for the various activities currently carried out in the PAs.

This term biodiversity refers generally to the number and variety of plant and animal species that inhabit an area of land or water. The organisms that make up biodiversity are part of the resources available to society. The value of biological resources may stem from their usefulness in production and consumption, their cultural significance or from some notion of their right to exist.

+ For any header with a symbol attached, please see note on Data Reliability in Section 1.3.

To define and estimate the economic value of biological resources, the literature now focuses on what are called *ecosystem services*, the beneficial outcomes of ecosystem functions[12]. Establishing the economic value of ecosystem services will help the public to understand why it is important to conserve biodiversity and how much biodiversity should be conserved. While we may never have a clear understanding of our dependence on biodiversity, it is still useful to know which aspects of biodiversity contribute to specific measures of human welfare.

The economics literature is clear that the rationale for valuing environmental resources in general, and biodiversity in particular, lies in the perception that the price signals generated by the market system – prices – are leading to excessive rates of biodiversity loss. This is because the prices, which largely reflect private market transactions, undervalue the true social value of *ecosystem services* or because those services are "non-marketed" and thus do not have market prices. Their value must be determined using non-market valuation methods aimed at monetary measures that are often site-specific, open to question and not always accepted in legal and regulatory settings.

Valuing ecosystem services is still very much in its infancy and subject to much controversy. Constanza et al[13] estimated the global value of a set of 17 ecosystem services at about US$ 33 trillion, the majority of which is outside the market system. Of interest is the contribution of the temperate/boreal forest (US$ 894 billion or US$ 302 per hectare per year) and of lakes/rivers (US$ 1.7 trillion/US$ 8,498 per hectare per year).

The specific values in the Constanza study will not be applicable to the services provided by the PAs because they are based on broad averages that could not be expected to apply to specific situations. They are cited to establish that ecosystem services do have economic value, even if that value is not captured in market transactions. It must also be noted that much valuation work remains to be done; in other words, many of the values currently available are subject to confirmation.

[12] See Appendix 3 for a list of terms related to ecosystem valuation.

[13] Robert Constanza et al, "The Value of the World's Ecosystem Services and Natural Capital", *Nature*, Volume 387, No. 6230, 1997.

With this background, this study has estimated values for some activities or ecosystem services supported or provided by the proposed PAs. For this, King and Wainger[14] provide a useful categorization of ecosystem services that applies to the proposed New Brunswick Protected Areas. Not all of the services they identify apply to the PAs. In Table 1, items in bold indicate the ecosystem services found to be relevant for the PAs and for which data were collected and analyzed in this report. To the extent possible, economic values are estimated for these services in the benefits and costs reported in the following sections. It is possible the other services may be relevant to the PAs, but we were unable to assess them within the time available for this study.

Working Assumption

For the socio-economic analysis of Protected Areas, we have adopted the working assumption that a variety of activities, which are classified as ecosystem services in Table 1, will be excluded[15]. This includes both commercial uses such as forestry, mining and trapping, and recreational uses such as hunting and fishing. The impacts of excluding activities are assessed in two categories: **benefits**, which are outcomes of protection; and **costs**, which are monetary costs or opportunity costs (economic goods and services foregone) as a result of protection.

[14] Dennis King and Lisa A. Wainger, *Assessing the Economic Value of Biodiversity Using Indicators of Site Conditions and Landscape Context*, Organization for Economic Cooperation and Development Workshop on Benefit Valuation of Biodiversity Resources, Paris, France, October 1999.

[15] We note this is a working assumption to explore the implications of such exclusions. The final decision on permitted and excluded activities is yet to be made.

Table 1: Categories of Ecosystem Services^

ACTIVE	PASSIVE
1. Commercial Uses: 1.1 Agriculture **1.2 Trapping (including bear baiting)*** **1.3 Mining (including genetic)*** **1.4 Forestry*** 1.5 Fisheries 2. Recreational Uses: **2.1 Fishing*** **2.2 Swimming*** **2.3 Hiking*** **2.4 Nature Viewing*** **2.5 Hunting*** **2.6 Birding+** **2.7 Boating/Canoeing*** 3. Municipal Uses: 3.1 Groundwater Recharge/Discharge **3.2 Drinking Water Purification*** 3.3 Pollution Prevention 4. Other Active Uses: **4.1 Aesthetics - visibility, odor, noise+** **4.2 Education/Learning Opportunities*#** **4.3 Research/Scientific Opportunities*#** 4.4 Cultural/Spiritual Enrichment	5. Property Damage Avoided: 5.1 Flooding 5.2 Storm/Waves/Surge 5.3 Siltation/Sedimentation 5.4 Over-nutrification 5.5 Noxious Weed Infestations **6. Human Health Risks/Costs Avoided:** **6.1 Nutrient Cycling+** **6.2 Carbon Cycling**** 6.3 Chemical Cycling 6.4 Oxygen Cycling 7. Ecosystem Health Risks Avoided: **7.1 Biodiversity Support+** 7.2 Endangered Species Protection^^ **7.3 Protection of Ecological Infrastructure+** 8. Climate Regulation: **8.1 Global Climate Effects/Attenuation** 8.2 Microclimate Effects/Attenuation 9. General Non-use (can be attached to places, species, features, etc.): **9.1 Existence Values**** **9.2 Option Values**** **9.3 Bequest Values****

^ Notes: Items in bold and marked with an asterisk (*) are specifically analyzed in this study. The other items, while possibly associated with Protected Areas, were not addressed.

\+ Possible use although not specifically identified in the research undertaken for this study.

\# Discussed in this study although as a possible future use and not as a current use.

** Discussed in this study but no specific values available for New Brunswick PAs; sample values for other areas cited.

^^ According to current knowledge, the PAs do not host any endangered species.

3.1.2 Carbon+

Human activities are a major source of carbon dioxide released into the atmosphere. Carbon dioxide is now known to be the most abundant gas related to global warming and climate change[16]. Thus, reducing carbon dioxide emissions or increasing ways to remove carbon dioxide from the atmosphere are important issues.

Forests act as both a carbon sink (a reservoir of stored carbon in tree fibre and roots) and a mechanism to remove carbon dioxide from the atmosphere through photosynthesis (often called carbon sequestration). For example, Kurz et al[17] found that Canada's forests over 1920-1989 have been a net carbon sink at the rate of about 200 million tonnes per year. They attribute this to the gradual shift towards a greater average forest age. This would suggest that as the forests in the PA's age, they could provide some incremental contribution to carbon sequestration. However, they also note that forests cannot age indefinitely. As they pass through maturity, net biomass growth rates decrease, fuel accumulates, and the susceptibility to insect attack increases. Nevertheless, since the PAs have large areas of forest cover and they are uneven-aged, they are thus capable of providing carbon sequestration as an ecosystem service well into the future.

Value of Carbon Sequestration

To put this in a Canadian context at the national level, Dore et al[18] estimates the economic value of carbon sequestration by Canada's forests in the year 1986 was about $27 billion[19]. This was about 5.5% of Gross Domestic Product ($506 billion). Value added in all manufacturing was about $100 billion with value added in the forest products industry at $6.5 billion. So, at a national level, the value of carbon sequestration is significant.

Existing estimates of the value of carbon sequestration in the PAs are not available. Combining data from the literature leads to an estimated value for the sequestration service of $1.43 million per year assuming full protection of the forests in the PAs.

---

[16] We are accepting the view that global warming is a fact on the basis that Canada is taking steps, to reduce its emissions of carbon dioxide and other greenhouse gases.

[17] W. A. Kurz, M. J. Apps, S. J. Beukema and T. Lekstrum, "20th Century Carbon Budget of Canadian Forests", Tellus 47B, 1995.

[18] Mohammed Dore, Mark Johnston and Harry Stevens, "An Ecological-Economic Analysis of the Role of Canadian Forests in Mitigating Global Climate Change", Journal of Sustainable Forestry, Vol. 5, No. 1/2, 1997, pp. 199-206.

This figure is based on studies that estimate the value of carbon sequestration in terms of the damage costs avoided by storing carbon rather than releasing carbon dioxide into the atmosphere. The key values used include:

- Recent work by Fankhauser has produced a value of $22 per tonne of carbon[20] taking into account the results of many studies and his own research.
- Van Kooten et al[21] estimate carbon sequestration for Canadian forest land (excluding British Columbia) ranging from 0.65 to 0.78 tonnes per hectare per year. (The low rate was used.).
- The proposed PAs have about 100,000 hectares of forested land.

If forest harvesting was permitted, the $1.43 million value would be substantially reduced, perhaps by as much as 50% in the early years after harvest and then return slowly to pre-harvest levels[22].

It must be noted however that the benefits of carbon sequestration accrue on a global level. Thus, while the forests of the PAs would generate the value, New Brunswickers would only enjoy a portion of the benefit directly. At the same time, it can also be seen as part of New Brunswick's contribution to Canada's international obligations that are discussed separately below.

---

19 The year 1986 was the most recent year for carbon sink data at the time of Dore's research.

20 Samuel Fankhauser, *Value Climate Change: The Economics of the Greenhouse*, Earthscan Publications Limited, 1995.

21 G.C. Van Kooten, Louise M. Arthur and W.R. Wilson, "Potential to Sequester Carbon in Canadian Forests; Some Economic Considerations", *Canadian Pubic Policy*, XVIII: 127-138, 1992.

22 Mark Harmon, William Ferrell and Jerry Franklin, "Effects on Carbon Storage of Conversion of Old Growth Forests to Young Forests", *Science*, Vol. 247 (9) pp. 699-702, February 1990 note that in most forests in which the age of harvest is less than the age required to reach the old-growth stage of succession they would expect the forest to be a net contributor of carbon to the atmosphere with the amount of carbon added varying among forests, depending on their maximum storage capacity and the difference between the timber rotation age and the age of old-growth state within the given ecosystem.

3.1.3 National and International Agreement and Obligations+

New Brunswick's Protected Areas: The Current Status

According to the *Protected Areas Strategy for New Brunswick Summary of Public Hearings and Recommendations*, about 1.4% of the province met the study's criteria for Protected Areas, namely "... unmanaged natural areas where change is allowed to occur with little human intervention". The total area that New Brunswick had protected in 1990 since the beginning of the Endangered Spaces Campaign was 80,800 ha, and this increased to 95,300 ha in 1999.[23] WWF Canada in 1999 estimated that New Brunswick had protected 1.3% of its forested natural regions.[24]

As a province of Canada, New Brunswick has an obligation to create Protected Areas as called for in a number of international and national commitments made by Canada. Among the commitments of interest are:

International Commitments

- Convention on Biological Diversity;
- Forest Principles (Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests). The United Nations Conference on Environment and Development in 1992;
- World Wildlife Fund's, Forests for Life;
- G-8 Action Programme on Forests.

National Commitments

- Green Plan;
- Canada Forest Accord;
- Statement of Tri-Council Commitment to Complete Canada's Networks of Protected Areas (1992);
- Whitehorse Mining Initiative (1994);
- Canadian Biodiversity Strategy, a national guide to the Convention on Biological Diversity;
- National Forest Strategy (1998).

---

[23] World Wildlife Fund, "New Brunswick", Press Release; http://www.wwfcanada.org/news-room/nb.htm

[24] World Wildlife Fund Status Report, Canada's Commitment to Forest Protected Areas, August 16, 1999; http://www. panda.org/canadianforests/canada48.pdf.

The nature of these commitments is outlined in Appendix 4. It is against this background that one must view the addition of the eight proposed Protected Areas to New Brunswick's current inventory of Protected Areas.

Proposed Protected Areas Strategy Contribution to Protected Area Commitments

The proposed Protected Areas strategy would add eight areas covering 159,305 ha to New Brunswick's Protected Areas network. This is approximately 2.2% of the province's land base. Combined with the existing 95,500 ha of land protected already, Protected Areas would account for approximately 3.5% of New Brunswick's land base. This would more than double the current level of Protected Areas and help to move New Brunswick towards the frequently cited 12% target cited by some national and international commitments[25].

So, by establishing the eight Protected Areas, New Brunswick would be fulfilling its role in establishing the national network of Protected Areas and thereby contributing to Canada's fulfillment of its national and international obligations. This can be seen as a qualitative benefit of the creation of the Protected Areas.

3.1.4 Education

The Protected Areas, as defined for this study, are areas that receive protection from disturbances of human origin. So, unlike parks, they would not be promoted as destinations for recreation and education, although a variety of existing recreational uses may be permitted to continue as described elsewhere in the report. The upshot is that the Protected Areas will not require development of any educational or interpretative programming. So the study does not estimate any costs for such initiatives.

Still, a minimum effort to inform the public about the Protected Areas may be required. This could consist of an informative brochure and possibly placing information on a website for general accessibility. A rough estimate of the incremental costs is $15,000, which is mainly for the brochure, assuming the website can be dealt with within DNRE's existing capability.

[25] We note however that the National Forest Strategy 1998 - 2003 only calls for "... by the year 2000, a network of Protected Areas representative of Canada's forest ecosystem classification categories, ...". The 12% figure, commonly cited by interested parties, is not actually part of the NFS commitment.

3.1.5 Benchmarking and Other Research}

The Protected Areas will represent unique areas in which research on undisturbed versus managed forests could be conducted, as well as other issues of scientific interest. For example, they will provide ideal areas for comparative and baseline research. They could serve as unmanaged benchmarks or controls against which changes in the province's natural environment could be measured.

The study foresees the DNRE Protected Areas Division encouraging the research community to use nature reserves for research projects. Ecologists on staff could prepare inventories on wilderness areas and identifying forest types as required. They could then approach university researchers and inform them what types of natural systems exist in the Protected Areas. The DNRE Protected Areas Division could act as a facilitator providing information about research opportunities in wilderness areas, encouraging research and even providing some support such as the use of helicopters or allowing researchers to stay at DNRE facilities located near the Protected Areas. However, this would all be done within existing budgets by strategic reallocation. In particular, the cost of research for projects would be borne by the research proponents. However, the DNRE Protected Areas Division benefits by keeping research data for its own use. Therefore partnerships would be the goal of every aspect of Protected Areas research management and research activities would be carried out at no incremental cost from the Province's perspective.

The ability to conduct the type of research outlined is a qualitative benefit of Protected Areas that could provide very valuable information for future forest management decisions.

3.1.6 Eco-tourism & Recreation Potential#}+

New Brunswick Tourism Trends

In 1999, the New Brunswick tourism sector experienced its most successful year ever with revenues reaching a high of $920 million. This is an 8% increase over 1998. The projected goal is to surpass $1 billion in tourism revenues by the year 2001. The number of visitors to the province in 1999 reached 1,458,000. In 1999, approximately 24,900 people were employed in the tourism industry.

The tourism season was extended in 1999 due to successful initiatives such as the White Gold Rush program and a fall tourism program. The White Gold Rush Program is a $450,000 campaign targetting snowmobilers and other winter product enthusiasts. During 1998-99, a primary product development focus was on the Outdoor Network Strategy and the Appalachian Range Strategy. The Outdoor Network Strategy provides an accessible network of outdoor opportunities across the province. The Appalachian Range Strategy, with its planned Destination Centre, scenic lookouts and signage, plays a significant role in the province's soft Eco-Tourism Strategy. The province recognizes that an opportunity to capitalize on the renewed environment interest exists through ecologically sound tours, outdoor adventure experiences, and tourism operations that practice a sound environmental focus. It is plausible that the proposed Protected Areas could play an important role in the eco-tourism strategy.

Eco-tourism Trends

An important trend in world tourism is to develop alternative tourism in an area to promote conservation of natural, historic and cultural resources. The World Tourism Organization shows a tourism shift favouring countries where flora, fauna, and ecosystems have the greatest diversity, and where the potential for nature tourism is highest. Eco-tourism and nature tourism are among the fastest growing market segments of tourism. Eco-tourism serves a number of functions including: complementing mass tourism by increasing attractions and authenticity; serving the needs of specific groups; supplementing the incomes of rural dwellers; and allowing some tourism development in areas of limited capacity.

Eco-tourism is being developed in many places as a means of justifying and achieving conservation objectives. More tourists are interested in participating in recreation, sports and adventure and learning about the history, culture, nature and wildlife of areas they visit. Tourists are also more physically and intellectually active now than previously. More tourists are interested in pursuing their special interests and hobbies based on nature and wildlife. They want excitement, an element of risk, or at least an "authentic" outdoors experience which are delivered through eco-tourism and adventure travel opportunities.

Adventure travel and tourism together form one of the fastest growing tourism sectors in North America. This rapid pace of growth is expected to continue. Despite the current expansion, Canada accounts for only a fraction of the North American adventure travel and eco-tourism market.

Research has found that key concepts underlying the travel motives of Canadian eco-tourists include wilderness, wildlife, parks, learning, nature and physical activity.

Tourism industry observers suggest Protected Areas market themselves: tourists will come, and go to the Protected Areas not necessarily because of something in particular that is there, but because the area is *protected*. Those tourists that do come for the eco-tourism or outdoor experience want to spend their time out of doors, not travelling between the things they want to see. Hence, it is important to market 'clusters' of activities, destinations centred around a particular theme located within a small area. Protected Areas can be a cornerstone component to this cluster. The world-class attraction that New Brunswick has is the Bay of Fundy; Protected Areas could be marketed with Fundy to birdwatchers, hikers, canoers and nature-lovers generally. While none in and of themselves are sufficient to attract significant tourism interest, or are currently subject to much use, each proposed Protected Area has potential to become part of network or cluster of tourism activities.

The tourist that will go to a Protected Area on its own, or as part of a longer tour that includes several natural areas, will tend to be a well-educated, higher-income traveller who will hire a guide or operator for a quality educational experience, often in small groups. Their interests might require the participation of an expert in the natural sciences to provide interpretation; depending on the area, this might be a biologist, ecologist or geologist.

Tourism industry observers note that it has become increasingly difficult to find good quality natural places; a network of Protected Areas is essential to maintain some of what is left. As wilderness areas become more scarce around the world, places that have protected their supply of wilderness will be able to meet the demands for this specialized kind of tourism and will thus take on increased value. Equally important is that eco-tourism's potential is enhanced if consumptive and motorized uses are prohibited, allowing those who come to appreciate nature in a more tranquil setting. Eco-tourism in New Brunswick is just getting started; the long-term investment in Protected Areas could aid the effort to establish the industry.

Eco-tourism and the Protected Areas

Currently, there are few eco-tourism operators in New Brunswick using the proposed Protected Areas for their tours. Two operators are guiding canoe trips on the Nepisiguit River in the Mount Carleton extension area or just south of it. Staff are trained in canoe instruction and eco-interpretation, and they try to offer regional food specialties such as fiddleheads and salmon in their meals when in season. Clients are encouraged to experience the wilderness and appreciate the local flora and fauna. Other eco-tourism opportunities appropriate to New Brunswick's proposed Protected Areas include cross-country skiing trips and mountain biking trips on trails not used by motorized vehicles. First Nations currently involved in eco-tourism projects in New Brunswick could also provide unique eco-tourism opportunities in Protected Areas (see Section 4.0).

For the purposes of this study, if an eco-tourism industry could be developed to support 500 travel parties annually, this could result in an annual economic impact of $450,000. This economic impact is based on an average nature tourism travel party expenditure of approximately $900 from the Nova Scotia Nature tourism Study completed in 1997. That study concluded that nature tourists spent more time in the province (almost twice as long as other tourists), travelled in larger parties (2.3 versus 2 persons), and spent more money during their stay (i.e. just under $900 per trip compared to non-nature tourism parties that spent an average of $470 per trip).

Development of the eco-tourism industry in New Brunswick has resulted in tangible economic benefits for rural communities. An example, the Bouctouche Bay Eco-tourism Project, provides opportunities such as boat rentals and tours, fishing, birdwatching, nature interpretation and cross-country skiing and has led to significant local economic generation. The Irving Ecocentre's development plans and management strategies have directly benefitted the town of Bouctouche and the village of St. Edouard as a result of community buy-in, infrastructure investment and economic spin-offs. Spin-off businesses include new accommodations, restaurants and eco-tourism developments such as kayaking and biking tours. There has also been a significant increase in the number of campgrounds, day adventure and multi-day packages and motorcoaches to the area over the last 4 years. Between 1996 and 1999, the private sector directly invested over $4.4 million in approximately 45 new tourism-related businesses, creating 150 new jobs and adding high-quality accommodations and enhanced activities.

Overall, the development of eco-tourism in New Brunswick supplied by the creation of Protected Areas, has the potential to generate substantial economic impacts.

3.1.7 Water Supply}

Three of the Protected Areas have a water supply area within their boundaries: Nerepis Hills, Loch Alva and Jacquet River. The Musquash watershed system includes over half of Nerepis Hills and Loch Alva. This watershed serves as a peak load back-up for the City of Saint John water supply system. The Nigadoo River water supply in Jacquet River serves Bathurst and other communities along the Bay of Chaleur. Both water supply areas have existed for some time and pre-date the proposed Protected Areas. The degree of protection afforded by a Protected Area may actually exceed what comes with being declared a water supply area. Forestry and other activities such as mineral development would be precluded entirely under the Protected Area status, rather than occurring with larger buffer zones or other restrictions within the water supply. To the extent that the wider buffer zones in the water supplies are ineffective, the additional protection may provide additional security of supply. One could speculate that this could have some economic value. For example, activities permitted in the buffer areas could cause a reduction in the quantity or quality of the water. It could become necessary to seek an alternative source or engage in additional treatment. The additional protection would help to avoid these costs and thus become a benefit of the PAs. However, according to officials dealing with the watersheds, the larger buffer zones have provided effective protection to the two water supplies. Thus, we are not prepared to assign an economic value to the inclusion of the water supply areas within a Protected Area. The analysis of the costs of protection captures whatever costs may be associated with including the water supplies in their respective Protected Areas. Hence, no incremental costs or benefits arise from the inclusion of the two water supplies in the Loch Alva and Jacquet River Protected Areas.

3.1.8 Susceptibility to Pests and Fires*+

Overall, as far as we can tell, implementing the Protected Areas does not appear likely to generate much change in the incidence of either forest fires or pests and disease.

According to the National Forestry database, human activities and lightning are about equally responsible for forest fires. The situation may be a little different in New

Brunswick if the 1998 forest fire season is any indication. Lightning was the cause of 17 forest fires that burned about four hectares. The rest of the 199 forest fires that burned about 150 hectares were caused by human activities. Under the assumptions used in this study, there might be a slight reduction in the probability of forest fires in the PAs because forestry, mineral development and other industrial activities would be excluded. They accounted for 16 fires that burnt about five hectares. Recreation and residents account for about 78 or 41% of the forest fires. To the extent these uses continue in the PAs (i.e. camps, fishing and hunting, and other recreation activities), there would be continued human activity in the Protected Areas of the type most associated with fires. On balance, there does not appear to be strong reasons to expect much change in the incidence of forest fires in the Protected Areas.

As for pests, there do not appear to be good reasons to expect the incidence of pests and disease to change within the Protected Areas as compared with other areas of the province in the short run. On the one hand, the forests in the PAs are multi-species and multi-aged and thus may exhibit greater resistance to disease and pests than mono-culture, even-aged plantations. On the other hand, over the 25-year study time frame, it is possible that as the forest grows older, it would tend to be more susceptible to pests and disease[26]. However, we are unable to say by how much or to assess whether there would be any incremental cost, that is, any cost in addition to the "normal" costs associated with responding to such natural disturbances.

3.1.9 Non-Measured Benefits+

The benefits of protection go beyond the visible benefits associated with various direct uses of the Protected Areas (e.g., education, research, and recreation) and the indirect uses such as carbon sequestration. The total benefits of protection also include such intrinsic benefits as the *existence* and *bequest* values of protecting area from uses that cause significant disturbance to the forested land and the water resources. Furthermore, people may express an *option value* to be able to use a Protected Area in the future that is made possible by virtue of its being protected and would not be possible in the absence of protection (e.g., the opportunity of studying an ecosystem undisturbed by human intervention).

[26] As noted by W. A. Kurz et al, op. cit.

Market prices do not exist for these types of benefits, although inherently, society places a value on them. In order to quantify the value of benefits based on individuals' intrinsic valuation and option value, economics use a measure known as "willingness-to-pay". Willingness-to-pay quantifies the benefits a person derives from the uses of an economic commodity as the maximum amount of money an individual would be willing to pay to have the commodity, rather than do without it.

Both the existence value and the bequest value refer to non-use values, and in that sense may be considered benefit values based on altruistic motives. That is, they refer to a value people place on the resource even though they are not users (or potential users) of the resource.

Existence value, specifically, refers to the value individuals are willing to pay for the knowledge that a resource exists. This value is a type of altruistic value since it is measuring the vicarious consumption of enjoyment an individual derives from simply the knowledge that a resource exists.

Bequest value captures another type of altruistic value of the resource. It refers to individuals' values of the resource, measured by their willingness-to-pay for the protection of a resource, not for their own use, but for future generations' use of the resource. Bequest value measures the value society places on knowing the resource will be protected not only today, but also in the future so that successive generations may enjoy the resource.

Willingness-to-pay estimates can be derived through surveying techniques which elicit consumer preferences by simply asking consumers how much they are willing to pay for a particular type of benefit associated with watershed protection policies. Since conducting a survey is outside the scope of this project, an alternative method is to use "benefit transfer" techniques, where willingness-to-pay estimates for another region can be modified and then transferred to New Brunswick, if applicable. Examples of such values include estimates of willingness-to-pay for old growth forests west of the Cascade Mountains in the United States from US $48 to US $144 per household per year. In the Southwest United States, willingness-to-pay for protection of critical habitat for

the Mexican spotted owl has been estimated at US$2-3.7 billion[27]. An examination of the literature of economic studies measuring the intrinsic values of Protected Areas found differing measures of estimated willingness-to-pay coefficients for a variety of situations that do not match well in the New Brunswick Protected Areas. A further problem for transferring them to New Brunswick is that they are all encompassing, and include the value of many other benefits. There is no way of separating out the value of intrinsic benefits only from these estimates.

In the end, we found no valid methodology to accurately estimate the value of the intrinsic benefits, including option values of protection policies using a benefit transfer method. Based on the many studies in the literature, we are fully confident that they will have a value for the people of New Brunswick[28]. It appears that estimating the value will have to wait for some specific contingency valuation studies in New Brunswick.

3.2 Costs

3.2.1 Forestry*#

State of the New Brunswick Wood Supply

We understand that the wood supply situation in New Brunswick is very tight for the wood fibre industries. The harvest levels are virtually at their maximum levels or beyond for all tenure classes. The current wood supply analysis shows that this situation will not be alleviated for at least 15-20 years.

Given this situation, any reduction in the allowable wood that is attributed to the Protected Areas Strategy must be carefully reviewed to ensure a full understanding of the economic impacts are documented.

---

[27] Loomis, J. and Ekstrand, E., "Economic benefits of critical owl habitat for the Mexican spotted owl: A scope test using a multiple-bounded contingent valuation survey", Journal of Agricultural and Resource Economics 22(2), 1997. Examples of these and a variety of other non-timber benefits are reported in Talberth, John and Moskowitz, Karen, The Economic Case Against National Forest Logging, Forest Conservation Alliance, December 1999.

[28] See, for example, Bishop, J.T. (ed) *Valuing Forests: A Review of Methods and Applications in Developing Countries*. International Institute for Environment and Development: London, 1999.

Wood Supply Impact Analysis[29]

To conduct the forest industry impact analysis, the DNRE Forest Management Planning Group prepared for us an analysis of the potential reduction in AAC for each Protected Area. The Planning Group used two alternative methods to complete their analysis, a Blocking Approach and an Average Productivity Approach. The two methods yielded similar estimates so, for our analysis, we averaged the two estimates to assess the economic impacts. The following summary, Table 2, shows the AAC impact, using the average result for each Protected Area. The total AAC impact is estimated to be almost 211 thousand m^3 of softwood and hardwood combined.

Jacquet River, Kennedy Lakes and the Canaan Bog account for about 62% of the estimated loss.

Table 2
Reduction in AAC for Each Protected Area

	Total Volume Impact m3/year	% of Total
Jacquet River	47,885	22.7
Mount Carleton Extension	17,404	8.3
Kennedy Lakes	45,547	21.6
Canaan Bog	36,337	17.2
Grand Lake Meadows	24,405	11.6
Nerepis Hills	10,496	5.0
Loch Alva	27,845	13.2
Caledonia Gorge	920	0.4
Total	**210,839**	**100.0**

Source: DNRE.

Economic Impact Analysis

In 1998, the New Brunswick Forest Products Association, Inc., commissioned a study to estimate the *Impacts of the Forestry Industry on the New Brunswick Economy*.

This study documented the importance of the forest industry to the province.

- 14,972 are directly employed, and an additional indirect 13,066 jobs can be attributed to the sector.
- Total employment is 28,038.
- Total direct income is $581.4 million.

[29] In Appendix 2, we present an alternative view on the estimated wood supply impact. This view is based on an analysis undertaken for the New Brunswick Natural Area Coalition and the World Wildlife Fund by REMSOFT Inc.

- Total combined direct and indirect income is $923 million.
- The industry paid $43.5 million in royalties and timber permits to provincial government.
- Direct forest industry workers paid $50.8 in provincial taxes.
- The total value of manufactured shipments by the industry is $2,983.5 million with exports accounting for $2,152 million.
- There are 167 manufacturing establishments including:
  - 62 sawmills
  - 5 pulp industries
  - 2 newsprint
  - 2 paperboard
  - 96 other

To undertake our analysis, we first determined what percent of the provincial harvest would be lost if harvesting activities are curtailed in the Protected Areas. Table 2-1 in Appendix 2 shows the total roundwood harvested and consumed in New Brunswick in 1998. The volume of wood lost to the Protected Areas equals 4.2% of total Crown AAC and 2.0% of the total provincial harvest from all tenure groups.

To estimate the potential employment impacts attributable to this loss of AAC, we have used forest industry employment data published by Statistics Canada for New Brunswick for the harvesting, sawmill and pulp and paper sectors. These employment data are then analyzed against the volumes of wood harvested and consumed by industry in New Brunswick.

Table 3 presents an estimate of the employment and incomes losses on both a direct and indirect basis. Appendix 2 contains the detailed steps taken in this analysis. In total, the 300 direct jobs and an additional 265 indirect losses for a total loss of 565 jobs could occur if the loss of wood supply occurs. The associated estimate of income lost is $11.6 million direct and a total of $18.6 million direct and indirect combined.

In addition to the employment impacts, the province will lose about $2.4 million annually in royalties from license holders. Also, if the wood processing industry in New Brunswick cannot replace the wood supply lost to the Protected Areas, they could experience a GROSS loss of almost $60 million annually in manufactured output (2% of almost $3.0 billion).

Table 3 Total Direct and Indirect Employment and Income Impacts		
	Employment	Total Income*
Harvesting	97	
Sawmills	99	
Pulp & Paper	104	
Total Direct	300	$11,649,808
Indirect*	265	$6,923,559
Total Employment Impact	565	$18,573,367

* Used coefficient from Fiander-Good, 1998.

This method of estimating the economic impacts corresponds closely to the method used by forest industry interests in the debate during the public consultations over the establishment of Protected Areas. In all likelihood, it overstates the actual employment effects that will occur. The methodology used above assumes there is a direct and fixed relation between forestry employment and the availability of fibre. This is not necessarily the case and there are several factors that influence employment in the sector at any given point in time including[30]:

- Technology change;
- Role of new value added products;
- Role of public policy;
- Availability of imports;
- Quantity of exports;
- Market conditions.

Adjustments related to any of these factors could serve to mitigate against expected job losses.

In total, the scale of impact to the industry is relatively modest for the industry as a whole. The loss represents about two percent of the fibre currently utilized in New Brunswick.

We believe the actual job losses that will occur are most apt to fall on the harvesting sector as opposed to the processing sector. Contractors who currently operate in or near the proposed Protected Areas will be most affected. This work closely relates to the wood volumes. However, because of the method to allocate the reduction in wood supply, the employment impact in the processing sector will be widely distributed across the industry as a whole. The provincial government has already stated that the

[30] This point is also argued in a report done by Dr. Andrew Secord titled *Forest Industry Employment and Protected Areas in New Brunswick*. The report was commissioned by the New Brunswick Protected Natural Areas Coalition and the World Wildlife Fund.

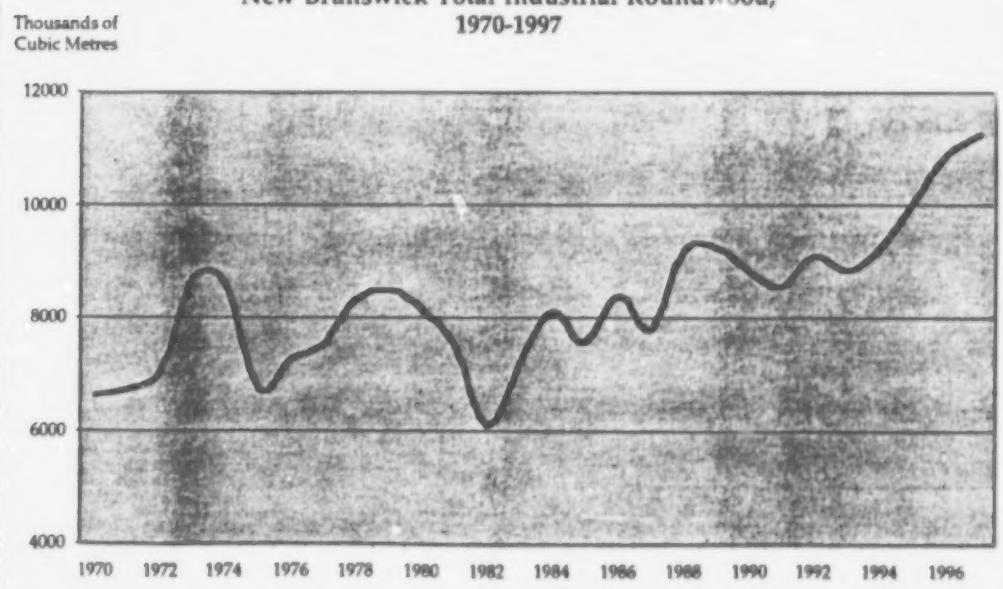
reductions in AAC will be distributed across all license holders proportionately so that no single license holder will bear a disproportionate share of the wood supply reduction.

There is concern that the smaller operations who are sub-licensees could suffer disproportionately. The province, when allocating shares of the Crown Licences, does factor in the performance of the various sub-licensees in terms of utilizing existing shares and in terms of operating modern and efficient mills.

Given that all mills operate in the competitive marketplace, they will likely attempt to replace the lost wood by securing supplies from alternative sources such as imports. This wood could be more expensive and cause their cost of operations to increase. Should they choose not to replace the lost wood, they will experience a decrease in capacity utilization. Either event will affect the economic returns associated with the operation of the mill, but would not necessarily lead to an identifiable loss of jobs.

The forest industry in New Brunswick is accustomed to fairly broad swings in harvest activity as dictated by the business cycle. Figure 2 shows the variability in demand for timber. It is evident that the impact associated with the removal of the wood in the Protected Areas is minor when compared to the ups and downs of the sector as a whole.

Figure 2:
New Brunswick Total Industrial Roundwood, 1970-1997



Although it is impossible for us to predict the actual job losses, we do agree the strict utilization of the relationship between fibre and employment will overstate the impacts. We also believe that the most vulnerable employees will be those who work in the harvesting sector in the immediate vicinity of the Protected Areas. As an example of how this type of impact will play out, we illustrate the experience of three contractors we interviewed as part of our research.

To put their case in context, they noted within the large area that includes Kennedy Lakes, the Canaan Bog, Nerepis Hills, Loch Alva and Grand Lake Meadows, there are approximately 700 forest workers thinning and cutting in the woods to supply wood processing plants. Given that much of the work is done on a piece-rate basis, as a rough guide, if a certain percentage of the supply is removed from harvest, approximately the same percentage of the overall forest employment could similarly disappear.

Irrespective of the loss of wood supply, the removal of a particular area has serious consequences for the independent owner-operator forest contractor. Using the example of the Canaan Bog, the three independent operators have purchased equipment specific to thinning this area. Each of the three machines are worth in the neighbourhood of $350,000, and the full season is needed to make the payments. While the machinery can, to some extent, be used elsewhere, the machines are particularly well-suited to the characteristics of the Canaan Forest. Moreover, these operators may not be able to move to other areas as there are contractors working throughout the productive forest who cannot be simply displaced – it is their territory. Should the three contractors lose access to this supply, an estimated 15 jobs could be displaced, including equipment operators, truckers, etc.

In Appendix 2, we examine employment trends in the New Brunswick forest industry over the past 10-15 years to put the impacts associated with the Protected Areas in context. This analysis shows that employment in harvesting sectors varies from year to year by quite large margins and in general, has decreased in recent years. On the other hand, employment in the sawmill sector has almost doubled since 1992. These changes have required the industry's labour force to make a number of adjustments over this time period. As noted previously, the scale of impact that results from the introduction of Protected Areas is small compared with the degree of changes that have faced this industry on an annual basis throughout the 1990s.

We also believe estimates of job losses associated with indirect jobs must be viewed with caution. Given the relatively wide distribution of job losses and that those losing jobs will likely not stay unemployed long term, indirect job losses will be difficult to isolate and attribute to this withdrawal of wood supply.

3.2.2 Mining and Mineral Development*#

Mineral Potential

The mineral industry in New Brunswick as a whole is an important economic sector. The following statistics for 1998 illustrate the magnitude of the industry:

- Total Employment: 3,868
  - Metals 2,158
  - Peat 1,144
  - Potash 348
  - Other 218
- Total Value of Production: $852 million
  - Metals $602 million
  - Non-Metals $186 million
  - Other $64 million
- Total Value of Exploration
  - 1999 $5.4 million
  - 1998 $12.3 million

As part of our analysis, we have reviewed the mineral industry activity for each of the proposed Protected Areas. This review has included both current production and exploration with the potential for production.

Mineral Production

Historically, there has been very minimal extraction of mineral resources from any of the proposed Protected Areas, except for the Canaan Bog where peat extraction currently takes place.

We understand the operating company is working on two bogs in the Protected Area with a current workforce of 26 seasonal employees and one permanent. They have a

processing plant valued at more than $1.0 million. Annual production is estimated to be over $1.0 million in sales[31].

In addition, the Canaan Bog has two more bogs that are under option to industry for development and two others that have been identified as having potential for development. These bogs could yield in excess of 2.5 million tonnes per year in production.

Mineral Development Potential

Our review of the mineral information available for each of the Protected Areas showed that there currently exists no defined mineral economic deposits or resources. There are many mineral occurrences but none of them constitute economic deposits.

This does not mean that there might not be a deposit that at the present time is unknown and may be discovered in the future. Some of the areas have a history of exploration and do have geological characteristics that are of interest to the exploration industry.

Mineral exploration is an iterative, sequential process. It is based on prior evidence of mineralization occurring in circumstances permitting economic exploitation of a mineral deposit. Areas presenting promising geology or where deposits were found in the past present higher priority targets for exploration companies. As new exploration takes place, the database on the area improves. Further exploration becomes more focussed and has a higher probability of success.

The decision to explore is normally the outcome of a complex decision process where several factors are taken into consideration. Prevailing and anticipated economic and commodity market conditions and tax regimes are such factors.

In Canada, it has been shown[32] that base metal economic deposits have on average considerable investment in exploration prior to discovery and subsequent development. In a paper by MacKenzie and Doggett, the average cost to find and delineate an economic deposit is approximately $63 million.

---

[31] Inter-office Memo, DNRE, Jacques Thibault to Rao Irrinki, September 3, 1998.

[32] MacKenzie and Doggett, CRS Perspectives, 1993.

Once found and in production, these mines can be major contributors to the economy. An example in New Brunswick of a major mineral discovery leading to a full-scale production is the Brunswick Mine which is Canada's largest zinc deposit and one of the largest in the world. The Brunswick Mine has been in operation since the 1960s providing miners with a relatively long-term of employment compared with most other major mining operations. In 1998, this mine employed an average 1,101 regular and contract employees at the mine and 589 employees at the smelter. The average weekly earnings reported for the mining sector in New Brunswick in 1998 was $860 which compares favourably to the average of $525 for all industries combined

Although it is impossible to know if such a development could occur in one of the Protected Areas, we have reviewed each area for its mineral potential. Our results are described in summary below. More detail on each Protected Area is found in Appendix 5.

Protected Area	Mineral Potential
Jacquet River	This area has significant mineralization in a north south band through its centre. In the past it has been extensively claim staked and explored. There is currently activity related to a gold play to the south west of the area. Relative to the other areas, Jacquet River has a greater potential for mineral development.
Central Highlands	There is at present considerable claim activity along the northeast boundary of this area. Apparently this area has a favourable Bathurst Camp type mineralization, although most of the area of interest lies outside the current boundary. Mineral development potential is higher for this area than for most of the other Protected Areas.
Kennedy Lakes	There is at present no claim activity in or near the Protected Area. Only a few occurrences recorded, much of area has granite rocks with little evidence of mineralization. Mineral development potential is low.
Canaan Bog	The proposed Protected Area is the host to an active and expanding peat operation. They now currently operate in two bogs. There are also two additional bogs in the area that have options for development. Two other bogs are also considered to have development potential. Aside from peat, there are no other know mineral occurrences. Part of the area is licensed for oil and gas exploration.
Grand Lake Meadows	The area has virtually no known mineral occurrences. There are some peat resources although none are expected to be developed in the near term. Part of the area is subject to an oil and exploration license. Overall, the area is considered to have low mineral industry potential.
Nerepis Hills	Part of this area is of current interest to the exploration industry. The interest is driven by the recent geological mapping and mineral discoveries that have resulted in the belief that potential economic concentrations of tin, gold and base-metal sulfides exist in the contact with the Saint George Batholith. There has also been interest at Square Lake in the exploration for tin and tungsten. Potential for mineral development in this Protected Area is higher than for most of the other areas.
Loch Alva	The area has few mineral occurrences recorded, the most significant of which is at Eagle Lake. Potential for further mineral development is low.
Caledonia Gorge	The mineral industry has historically been active in this area. However there are few known mineral occurrences and those that do exist lie to the west and uphill of the Protected Area. There is no current claim staking activity. Potential for development in the future is low.

Oil and Gas Exploration

The general rule for oil and gas exploration is that licenses are issued for eight years provided that annual work commitments on the license are met. Only two Protected Areas have oil and gas licenses covering part of their proposed territory. These are Grand Lake Meadows and Canaan Bog. According to DNRE, the current license holder plans to conduct an airborne geophysical (aeromagnetic) survey in the summer of 2000 that will cover its license areas including parts of the two Protected Areas. If the airborne results show promise, they could be followed up with ground seismic studies.

The area of interest is the Maryville Sub-Basin about which there is currently little geological information. To date, there have been no boreholes or seismic studies completed. Based on available information, the general belief is that the western side of the basin has greater potential than the eastern part, which lies under the Grand Lake Meadows. The northern part has very low potential and lies to the north of Grand Lake Meadows anyway.

As for the Canaan Bog, available information indicates that the area of real potential lies southeast of the area and that there is very little gas and oil potential in the bog area itself.

These areas and other parts of south central and south east New Brunswick have taken on increased interest for the oil and gas industry because of the construction of the natural gas pipeline.

Value of Mineral Industry Activity

Estimating the economic value of mineral industry activity in the proposed Protected Areas is difficult. To conduct our analysis, we have contacted industry participants who are known to be currently interested, or to have been interested in the past, in these particular areas. These industry informants are reluctant to speculate on the value that would be invested in any of the areas if they were to remain open to prospecting and exploration. However, from the informant's general responses, we estimate that in the next 5 years, the following activity could plausibly take place assuming the current very low level of exploration activity continues.

This estimate should be viewed as a background level of exploration expenditure only. Key assumptions of this estimate are that:

- Exploration activity in New Brunswick remains at its 20-year low.
- Major mining companies do not have regional exploration offices or programs in the province.
- Noranda remains restricted to areas immediately surrounding their Brunswick #12 mine.
- Commodity prices remain similar to today.
- No mineralization of significance is found.

Furthermore, the estimate does not include expenditures on claim staking, fees for rights and permits, or landholder agreements or option agreements. It also includes only expenditure for metallic minerals and does not include industrial minerals, peat, coal, oil, or gas.

- Jacquet River: parts of several programs (each program is assumed to be basic exploration at about $100,000/year), say half one and 20% of two others. If base metal prices strengthened and if Noranda begins less restricted exploration, this could easily rise to 2 or 3 multi-year projects;
- Nerepis Hills: parts of several programs, say 20% of three;
- Central Highlands: part of one program over 3 years, say 10%;
- Caledonia Gorge: part of one program, say 20% of one year; and,
- Loch Alva, Kennedy Lake, Canaan Bog, Grand Lake Meadows: no activity.

So, a very speculative five-year exploration estimate if no Protected Area restrictions existed would be:

Jacquet River	$90,000
Nerepis	$60,000
Central Highlands	$30,000
Caledonia Gorge	$20,000
Total	$200,000

A case could probably be made for a slight decrease in expenditure for claimstaking, pre-staking assessment, and exploration work on claims immediately adjacent the areas. This could be in the order of another $100,000. This five-year rate is probably a fair estimate of activity over the longer term, as long as the areas are not protected or there is no significant mineral resource found in any of the areas.

If any mineralization was discovered on any of these projects, the level of expenditure would rise considerably, even if the discovery was adjacent to the area and not within it. Advanced exploration (soil geochemistry, multi-technique ground geophysics, drilling,

bulk sampling) and development have annual project budgets of $500,000 to $2,000,000 and include more advanced evaluation of the mineralized target and basic exploration over adjacent areas.

A significantly different estimate would be arrived at if one were to propose a basic exploration evaluation for one of the proposed areas. This would result in a much higher estimate over 1-3 years.

3.2.3 Trapping#

Trapping is a long-standing cultural and economic activity in New Brunswick. Equally traditional are the areas of land that an individual trapper works during the four to five month winter season. These territories have often been delineated over the course of many years, and most trappers respect fellow trapper's boundaries. Thus, trapping participants argue that access to traditional trapping areas in the proposed Protected Areas is important. Although they do not represent a large proportion of available trapping land, losing access to them could force a trapper to leave without necessarily having elsewhere to go.

Of the estimated 1,300 trappers in New Brunswick, approximately 200 are members of the provincial association. These members are the more active trappers and account for most of the income earned. Trapping provides a small but important supplemental income, in the range of $4,000 to $6,000 per year, although the more active trappers may earn as much as $14,000 per year. Animals that are actively trapped include beaver, marten and otter, as well as muskrat, mink, fox, coyote and bobcat. The total annual value of the trapping industry in New Brunswick over the past six years has ranged from $550,000 to $1 million.

The three northern-most proposed Protected Areas are the most heavily used of the eight in total. The Association argues that there is no reason to prohibit trapping. No animal pursued is endangered, existing trails are used, trappers tend to travel lightly on the land, and activity is kept well away from other uses. In some areas – Grand Lake Meadows for muskrat, and Jacquet River for coyote, in particular – the Trappers Association suggests that the absence of trapping will lead to a population rise to the detriment of the area's ecological balance. However, we note that over time, nature will usually find ways to balance populations of species where some imbalance occurs because of an abrupt change such as the cessation of trapping in an area. Furthermore,

animal population control measures are always an option if nature's response is regarded as being too slow.

Currently, the number of trappers overall is low, but the number fluctuates according to pelt prices. Recently, pelt prices have been at the low end of their cycle. An associated concern of trappers relates to a potential ban of their primary mode of transportation (ATVs, snowmobiles). Such a ban would severely reduce access to areas for trapping.

3.2.4 Hunting and Sport Fishing#

Big Game

Hunting in the Province

Big game hunting in New Brunswick is a traditional activity. It is considered by many to be an integral way of life for many residents, particularly those living in rural areas. Non-resident hunting is also an important economic activity for the New Brunswick Outfitting and Guiding industry. Big game hunting is comprised of three separate hunts, deer, black bear and moose. The activity at a provincial level is described below.

Deer

Season:	Fall October 26-November 24
Total Licence Revenue:	$1.2 million
Resident:	
Licences 1998:	64,165
Trend in Licences:	Peaked in mid-1980s at about 100,000. Licences have dropped steadily since.
Harvest 1998:	9,792
Trend in Harvest	In the range of 25,000-30,000 during1980s, it has dropped steadily since.
Harvest Rate:	1 deer per 6.6 licence holders
Non-Resident:	
Licences 1998:	1,653
Trend in Licences:	Down from approximately 6,000 in mid-1980s.
Harvest 1998:	292
Trend in Harvest	Down from about 2,000 in mid-1980s.
Harvest Rate:	1 deer per 5.7 licence holders.

Bear

Season:	Spring April 20 - June 27 Fall October 1 - November 7
Total Licence Revenue:	$164,333
Resident:	
Licences 1998:	1,091
Trend in Licences:	Steady in 1990s.
Harvest 1998:	243
Trend in Harvest	Usually between 200-300.
Harvest Rate:	1 bear per 4.5 licence holders
Non-Resident:	
Licences 1998:	2,584
Trend in Licences:	Fairly steady last five years.
Harvest 1998:	1,087
Trend in Harvest	Approximately 1,000 each year.
Harvest Rate:	1 bear per 2.4 licence holders.

Moose

Season:	Last Thursday, Friday and Saturday of September.
Total Licence Revenue:	$754,498
Resident (by draw):	
Licences Applied for 1998:	55,590
Licences Issued:	4,804
Licence Trend	Draw was at 6,000 till 1993, dropped a bit, has been increasing since 1999
Harvest 1998:	2,377
Trend in Harvest	Between 1,600 and 2,500 in the 1990s
Harvest Rate:	1 moose per 2 licence holders
Hours Hunted:	175,796
Non-Resident (by draw):	
Licences Applied for 1998:	1,105
Licences Issued:	96
Licence Trend	100 non-resident licences since 1996
Harvest 1998:	50
Trend in Harvest	Between 30 and 50 each year
Harvest Rate:	1 moose per 2 licence holders

Hunting in the Protected Areas

As part of our research, we interviewed DNRE staff who are familiar with hunting activity in each of the proposed Protected Areas. Hunting is an important activity for most of the areas. Our specific comments for each area are summarized earlier. In addition to the interviews we have also estimated the harvest of big game for each of the Protected Areas. The estimate was derived by allocating the reported hunt in each Wildlife Management Zone to the Protected Areas on a land area proportional basis. In addition, we estimated the number of hunters for each area by using the harvest rate per licence shown above. The results of this allocation are as follows:

Table 4
Big Game Harvest by Protected Area

	Deer	# of Hunters	Bear	# of Hunters	Moose	# of Hunters
Jacquet River	0	0	3	8	14	30
Mt. Carleton Extension	6	40	2	6	5	10
Kennedy Lakes	15	100	4	11	11	20
Canaan Bog	97	640	8	22	8	15
Grand Lake Meadows	32	210	5	14	5	10
Nerepis Hills	45	300	6	15	9	20
Loch Alva	60	400	8	22	12	25
Caledonia Gorge	4	25	1	3	1	2
Total	**259**	**1,715**	**37**	**101**	**65**	**132**

As part of our interviews, we asked what would happen if Protected Areas were closed to hunting. For most areas, it is predicted that hunters would simply relocate to other areas to undertake such activity. The number of hunters who would cease hunting is believed to be minimal. If this were to occur, there could be a reduced hunting experience as other areas would be more crowded. However, given that most hunting activity is trending downward, in the medium term the quality overall hunting experience could remain fairly consistent.

Economic Value

A summary of the economic value of big game hunting in the Protected Areas is summarized in Table 5.

Table 5
Big Game Hunting Economic Impacts by Protected Area

	Hunter Days	Total Direct Expenditure ($)	Taxes ($)	Jobs	Income ($)
Jacquet River Gorge	223	12,325	3,636	0	5,768
Central Highlands	793	22,075	6,512	0	10,331
Kennedy Lakes	1,902	52,050	15,355	1	24,359
Canaan Bog	11,034	279,225	82,371	5	130,677
Grand Lake Meadows	3,748	95,950	28,305	2	44,905
Nerepis Hills	5,289	136,725	40,334	3	63,987
Loch Alva	7,080	182,625	53,874	3	85,469
Caledonia Gorge	471	12,225	3,606	0	5,721
Total	30,540	793,200	233,994	15	371,218

In total, it is estimated this activity generates about $800,000 in expenditures per year. This expenditure results in government collecting tax revenue of about $230,000[33]. Total direct and indirect employment supported will be about 15 jobs with an associated income of almost $375,000. These estimates were derived using an allocated hunting effort converted into economic impacts using coefficients for New Brunswick from the *Importance of Nature to Canadians: The Economic Significance of Nature-Related Activities*[34].

Waterfowl Hunting

The area of interest for waterfowl hunting is the southern portion of Grand Lake Meadows. This area is, by far, the main inland waterfowl hunting territory in New Brunswick. This area has also been the site of considerable investment by Ducks Unlimited and the Easter Habitat Joint Venture in habitat restoration projects.

The first two weeks of duck season is the busiest – this means the opening two weekends, and to a lesser extent, the week between. After that, interest drops off considerably. People will go out in July to their favourite spot for opening day, and

[33] This figure includes tax revenues associated with the total direct expenditures, as well as spin-off spending.

[34] Prepared by the Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians, published by Public Works and Government Services Canada, Ottawa, Ontario, 2000.

drive a stake with their name on it. Generally, other hunters will respect that, and move a few hundred yards off. By September, it is hard to find a spot to go. People do not move easily and if an area were to be removed, not all could find other places to stake.

Within the proposed Protected Area, it is estimated that about 200 hunters are active of a total of nearly 1,000 along the whole stretch of the river, including the islands.

This is the heart of the hunting area, and if a large part were removed, there would be great difficulty accommodating hunters in adjacent areas.

Outfitters

Outfitters in the province of New Brunswick operate during a 5 month season, taking paying customers to hunt bear, moose and deer, and to fish the rivers and streams. Some, as a supplement, will trap as well. Most bait bear, as this is the most lucrative component to outfitting. For those that participate, about 75% of their business is derived from bear. Because of the way the quota system works for bear licenses, if an area used by an outfitter is removed, then those licenses, and the revenue that comes with it, is lost. For those areas that closely match the territory of a particular outfitter, their designation as a Protected Area (if no baiting is permitted) would put them out of business.

There are an estimated 220 outfitters in the province, and about one-third of them would be affected in some way by the Protected Areas designation. The loss of a bear licence is equal to the loss of approximately $1,000 to $1,200, plus the loss of associated jobs (mostly guides and cooks).

Loch Alva and Nerepis are used for deer, bear (approximately 90 licenses) and fishing for bass and trout. The total revenue lost for these two areas would be in the neighbourhood of $200,000. Caledonia Gorge hosts approximately 25 licenses, with a few deer; Mount Carleton has 100 licenses, with some moose and good trout fishing; Jacquet River not much; Kennedy Lakes has about 50 bear licenses; Canaan Bog has 30; and Grand Lake Meadows is a big duck hunting area without much bear. As with the trappers, the prohibition of motorized transport would effectively close off the opportunity to outfit.

Sport Fishing in New Brunswick[#*]

Renowned New Brunswick rivers such as the Restigouche and the Miramichi have for many years attracted anglers from around the world seeking Atlantic salmon. This species continues to be the most sought after species by non-residents angling in the province. The economic impact of this segment of the sport fishery is significant.

New Brunswick has also more recently achieved international acclaim for its small-mouth bass fishing opportunities in the southwestern part of the province. Many anglers state that the province has one of the best bass resources in North America. The sport fishing industry in New Brunswick is comprised of two important sub-sectors: a non-resident and resident fishery. New Brunswick residents participate in these both salmon and bass fisheries as well. Other popular sport fishing pursuits for both residents and non-residents include brook trout, shad, chain pickerel, landlocked salmon, white perch, and yellow perch.

In 1998, a total of 78,138 angling licenses were sold in New Brunswick. Approximately 9% of the total population or 69,210 residents of New Brunswick obtained angling licenses, while non-residents purchased 8,928 angling licenses. Salmon licences were purchased by 50,074 residents and 3,371 non-residents. Trout licences were purchased by 16,890 residents and 5,420 non-residents. The remaining 2,383 licenses were sold mostly to residents for ice fishing.

Sport fishing that currently takes place in the proposed Protected Areas is comprised primarily of a resident fishery with a very small proportion accounted for by non-residents. Table 6 provides a summary of sport fishing activity for each area. Information on main fisheries quality of experience and habitat and an estimate of effort is provided. This information was compiled through interviews with DNRE regional staff and the Fish and Wildlife Branch.

Table 6
Summary of Sport Fishing Activity in the Proposed Protected Areas

Protected Area	Main Fisheries	Quality	Effort
Jacquet River	Sea run brook trout and late salmon on Jacquet River. Also, brook trout fishery on Antinouri Lake, Nigadoo River, tributaries of Elm Tree River.	Good quality experience reported for all areas noted, except Antinouri Lake, which is fair. Good habitat reported for noted areas.	About 3,500 angler days estimated.
Central Highlands	Brook trout on Nespisiquit River.	Outstanding quality experience supported by exceptional quality habitat.	2,000-2,500 angler days per year.
Kennedy Lakes	Mainly trout in lakes, some salmon on open Crown Waters on North Branch Renous River. Accessible lakes; Burton, Mud and Fish Lake. Kennedy lakes less accessible.	Accessible lakes tend to be over-fished. Kennedy Lakes pressure is light and quality is fair to good.	3,500-4,000 angler days.
Canaan Bog	Brook trout in streams and chain pickerel in Lakestream lakes.	Utilization is reported as light. Major streams area accessible.	500-1,000 angler days.
Grand Lake Meadows	Brook trout fishery on Little River. There is also a commercial fishery for gaspereau, shad and eel some in the area and outside the area.	Good experience and good habitat. Provides good habitat for commercial species both in and out of area.	1,000-1,500 angler days.
Nerepis Hills	Weddleburn and Square Lake brook trout and in Gagetown area fishing is reported as good for brook trout.	Reasonable quality fishing available. Best fishing in areas with limited access.	1,000-1,500 angler days.
Loch Alva	The Musquash drainage system has a variety of fish species the most important of which are brook trout, small-mouth bass, and landlocked salmon. Loch Alva is also important.	Good quality fishing reported with moderate to heavy pressure due to number of camps in the Protected Area.	3,000-3,500 angler days.
Caledonia Gorge	Brook trout and rainbow trout on two small streams and Crooked Creek.	Good experience with light to moderate utilization. Habitat may be important downstream fishery outside the Protected Area.	Less than 1,000 angler days.

Economic Value of Sport Fishing

The economic value attributable to the sport fishery in the Protected Areas are presented in Table 7.

Table 7
Sport Fishing Economic Impacts by Protected Areas

	Days Fishing	Total Expenditure $	Taxes $	Direct and Indirect Jobs	Income $
Jacquet River Gorge	3,500	87,500	25,813	2	40,950
Central Highlands	2,250	56,250	16,594	1	26,325
Kennedy Lakes	750	18,750	5,531	0	8,775
Canaan Bog	3,250	81,250	23,969	2	38,025
Grand Lake Meadows	1,250	31,250	9,219	1	14,625
Nerepis Hills	3,750	93,750	27,656	2	43,875
Loch Alva	1,250	31,250	9,219	1	14,625
Caledonia Gorge	1,000	25,000	7,375	0	11,700
Total	17,000	425,000	125,375	8	198,900

Source: Day fishing estimate by DNRE.

In total, sport fishing with Protected Areas generates about $425,000 in expenditures on an annual basis. This expenditure will result in government collecting tax revenue in the order of $125,000 per year. Total employment supported by this expenditure will be almost eight jobs with an associated income of almost $200,000.

These estimates were derived using the estimated angler effort in each Protected Area and various coefficients for New Brunswick in *The Importance of Nature to Canadians: The Economic Significance of Nature-Related Activities.*

Non-Consumptive Recreation

3.2.5 Snowmobiles

New Brunswick snowmobilers use an extensive network (approximately 9,000 km) of groomed trails that crisscross the province. Maintained by the 62 clubs that make up the Federation of Snowmobile Clubs, the trails are set on land over which snowmobilers have been granted the right to travel. The 18,000 people who bought a (currently voluntary) membership in the Federation represent approximately 40% of the snowmobiles registered in New Brunswick. The money earned from memberships is essential to help pay for the purchase, maintenance and operation of about the 90 pieces of grooming equipment owned by the clubs. The cost is considerable -- the replacement

value of this equipment is approximately $140,000 per machine. During the summer, and to a lesser extent also during the winter, ATV use on these same trails has grown considerably. Currently, ATVs do not pay for trail maintenance, nor have they been included in the agreements with landowners that governs the permission to use the trails.

Without question, the most important snowmobiling area is in the northern part of the province. Receiving the most snow, it enjoys the longest season. Snowmobilers in the south will use north-south trails to get to these areas, and few of these travel corridors fall within a Protected Area. An important trail runs through the proposed Mount Carleton Protected Area; businesses in this region have either started or expanded to service the snowmobile (and ATV) users. Snowmobilers largely stick to the groomed trails, so most use is confined to those defined areas. Kennedy Lakes sees the heaviest off-trail use.

A second important area is the Caledonia region where the biggest club in the province operates. This club maintains an extensive network of trails, including one that passes through the Gorge.

Although snowmobile use has dropped in recent years (concurrent with the rise in ATV use), they are an active user in many of the Protected Areas.

3.2.6 ATV Use

ATV use in New Brunswick is growing. Recent information indicates that there are about 26,000 registered users in the province. This number represents about a 20% increase in the last year.

The three to five year goal of the New Brunswick ATV federation is to create a network of 200-400 km of trails for each of the 33 clubs around the province and then to link each of these networks together. The federation is following this plan to help to ensure that ATV users have somewhere to go that is a recognized site for ATV use. They are currently negotiating with landowners to gain access, especially to old and secondary roads. Some clubs own grooming equipment, making this a year-round activity. With this approach, they hope to reduce conflicts that have arisen with landowners and other non-ATV land users.

Current ATV use of the proposed PAs is uneven because users tend to stick fairly close to their Club territory. On this basis, use of Nerepis Hills, Loch Alva, Grand Lake Meadows, Caledonia, Canaan Bog and Kennedy Lake is rated as very low because they are all somewhat removed from Club activity. What this means is that there is some ATV use of these areas but it is mainly by hunters and fishers and camp owners using them as transport. The areas themselves are not part of a club's formal trail plan.

There is currently a high level of ATV activity in the Mount Carleton area. The Federation is attempting to create an arrangement with the snowmobile club, to gain access to snowmobile trails in return for maintenance work. Popple Depot is very popular, although most users stay north of Route 180 which passes north of the Mount Carleton PA.

Jacquet River Gorge is also a heavily used area. It links Balmoral, Belldune and Bathurst together, and there are plans to use the roads and snowmobile trails in existence there. Of the eight proposed PAs, access to Jacquet River is the biggest concern to the federation.

3.2.7 Corridors#

This terms covers electricity transmission lines, gas and oil pipelines and highways. Some Protected Areas are crossed by transmission lines, such as, for example, Loch Alva, Nerepis Hills and Grand Lake Meadows. These will continue to exist, although no new lines will be permitted to pass through a Protected Area once the area is declared protected. Available information indicates that there are no options declaring the possible intention to build any future transmission lines through one of the Protected Areas.

The same is true for railway lines. However, a Canadian National right of way does pass through the Canaan Bog. There is also a Canadian Pacific right-of-way that passes along the southern boundary of the upper portion of Grand Lake Meadows and cuts across the isolated area that borders on the Acadia National Forest.

The natural gas pipeline route passes close to part of the southern boundary of Canaan Bog and through part of the Grand Lakes Meadows. There is also a trunk line route for service to Saint John that passes along or near to the southern boundary of Loch Alva.

Highway 108 passes through Kennedy Lakes. Highway 126 passes along the eastern edge of Canaan Bog and Route 10 traverses Grand Lake Meadows. Route 7 passes between the Crown land and Gagetown parts of Nerepis Hills.

All of these corridors pre-date the proposed Protected Areas. Use of them will continue once the PAs are declared. We estimate no incremental costs or benefits associated with these activities in relation to the Protected Areas.

3.2.8 Establishment and Administrative Costs#

Establish and Maintain Boundaries

We have identified two possible methods for identifying PA boundaries: conventional methods and natural markers. We believe that making maximum use of the natural markers method would reduce costs but we are unable to say by how much at this time.

Conventional Methods

Using the Protected Area boundaries defined for this study, the estimated kilometres of boundary line is as follows:

Protected Area	km boundary
Jacquet River Gorge	75 km
Mount Carleton Ext.	45 km
Kennedy Lakes	85 km
Canaan Bog	90 km
Grand Lake Meadows	145 km
Nerepis Hills	105 km
Loch Alva	100 km
Caledonia Gorge	40 km
Total	685 km

The cost of boundaries depends on a variety of factors. These include:

- The accuracy or precision of the lines;
- Whether new lines have to be established or existing lines can be refreshed;
- The type of surrounding vegetation (alders fill in more quickly than types);
- The type of signage used (aluminum, painted metal, plastic tags); and,
- The proportion of the Protected Area boundaries that need to be physically marked on the ground as opposed to appearing only on a map.

Given these factors, the cost per kilometer can range as follows:

- From as high as $3,500 per kilometre to cover the most difficult situation;
- To about $1,000 per kilometre to cut, blaze and post signs along a 3-foot swath for an average situation;
- To about $650 per kilometre to refresh existing Crown Land – private land interface;
- To as low as $250 per kilometre where only painting blazes and installing signage is required.

From a review of the currently proposed boundaries on 1:25,000 maps considering Crown land – private land interface and accessibility from main roads and forest roads, we estimate that a little less than 90% on the boundary perimeter will require marking. Further assuming that one-third of the boundary marking can be done for $1,000 per kilometre, one-third for $650 and the final third for $250, the estimated total cost of establishing boundary lines is about $375,000.

The lines will need to be refreshed every five to ten years depending mainly on the rate of vegetation overgrowth. Although theft and vandalism can be a problem in some areas, it is thought that the relative remoteness of the Protected Areas will reduce this problem. Refreshing lines is estimated to cost $500 per kilometre. Assuming about 20% of the lines will require attention annually beginning in about five years, the yearly cost will be about $60,000.

Natural Markers

We note that other jurisdictions such as Ontario are not planning to blaze the boundary lines of their new Protected Areas in remote areas. Instead they plan to use field recognizable boundaries (county lines, the edges of creeks and other waterbodies, heights of land and other natural features) and to use their digitized land base to create maps at an appropriate scale that can be shared by government departments and private companies. Boundary markers will be used where there is adjacent private land or nearby population centres. Nova Scotia is following a similar approach: posting signs at known access points and where there is active adjacent land use, plus detailed mapping at 1:10,000 and GPS positions to locate access points on boundary lines. These options provide a means of reducing or controlling boundary costs that New Brunswick may wish to consider.

Enforcement Costs

Once boundaries are established, the study assumes that enforcement will be carried out by the existing DNRE complement of seasonal wardens and year round forest rangers. They can be allocated to deal with the Protected Areas on a priority basis through initiatives such as spot-checking. Furthermore, we expect that addition of the eight new Protected Areas will provide the opportunity to extend the use of volunteers to assist with enforcement functions as is being done on the Province's developing trail system. Thus, the study estimates no incremental enforcement costs.

4.0 FIRST NATIONS INTERESTS

The analysis in Section 3.0 deals primarily with uses or potential uses made of the Protected Areas by the non-native community. To complete the picture, we wish to note the past, current and possible future uses by the First Nations people.

The current concentration of First Nations communities is along the Saint John River, close to or along the Gulf of St. Lawrence in the north and eastern parts of New Brunswick and on the Peticodiac River near Dorchester. This puts seven of the PAs – Jacquet River, Mount Carleton Extension, Kennedy Lakes, Grand Lake Meadows, Canaan Bog, Caledonia Gorge and Nerepis Hills – within reasonable proximity. Loch Alva is slightly more distant. In historical terms, one could expect some First Nations use or familiarity with all of the areas.

We do not have any explicit examples of recent current use, although such information may yet become available. However, there are indications of First Nations interest in two of the PAs, Jacquet River and Mount Carleton Extension. This could lead to future use and is certainly based on historical use and knowledge of the areas.

The Pabineau Falls First Nation is in the process of developing a Mi'kmaq hiking along the south shore of the Nepisiguit River to run from Bathurst to Mount Carleton Provincial Park. The trail would pass through Popple Depot[35], which was an important traditional meeting place for Mi'kmaq Indian families, and follow the traditional migration route of Mi'kmaqs moving from wintering to summering grounds. As an eco-tourism development, this trail would be restricted to hiking only. It would serve as an educational resource along which users could be educated on the historical use of the area by the Pabineau ancestors.

The Eel River Bar First Nation is currently building a 45 hectare Aboriginal Heritage Garden near Charlo. The area would be used to identify plants used by natives for medicinal purposes. They are also developing eco-tours on Heron Island that will focus on bird watching and nature study. Eel River would like to use Jacquet River Gorge as a

[35] The trail would complement the ideas proposed for the multi-use management of the forest in the area described by Tom Murray and Julie Singleton in the *Popple Depot Forest Ecosystem Design Project*, January 1996, organized by Canadian Forest Service, Fredericton; REPAP New Brunswick, Inc.; Stone Container (Canada) Inc.; New Brunswick Department of Natural Resources and Energy, Maritime Forest Ranger School, and other forest users.

base for research and training[36] and has applied to the New Brunswick government to conduct research in the Jacquet River Gorge area for 5-7 years. They would like to identify medicinal plants in this area and provide their staff with more experience in plant identification. They would eventually like to expand their area of research to cover flies, butterflies, birds, frogs and so on. They would use a partnership approach whereby they would bring in non-native scientific people to assist them with their research. While this First Nations group does not want to bring other visitors to the Jacquet River research site, it would like its staff to teach the public in surrounding communities about proper wild crafting techniques. It would also like to use a web cam over an osprey nest as an educational tool.

The potential economic benefits of these type of projects is considered in the eco-tourism section of this report (Section 3.1.6).

[36] Eel River has a number of related research projects underway that are supported by the Smithonsian Institute in Washington and the Museum of Nature in Ottawa.

5.0 IMPACTS ON ADJACENT LANDS

The discontinuation of various recreational activities conducted in the Protected Areas could result in impacts on lands that are adjacent to the PAs. Also, the availability of alternative areas in which to conduct the displaced recreational activities will largely determine the overall net impact associated with the discontinuation of the activity in a Protected Area. To assess this, we examined the potential for recreational pursuits to be redistributed to adjacent areas. The following table summarizes our findings for each proposed Protected Area.

Generally, we found that the activity can be absorbed in adjacent areas with limited impact on the quality of the experience. Specifically:

- **Hunting** – For most areas, effort can be accommodated on adjacent Crown lands will little differential in the quality of the experience. The exception is in Loch Alva where not all of the effort could be transferred with affecting the quality of the experience. Waterfowl hunting at Grand Lake Meadows would also suffer a drop in experience quality.
- **Fishing** – The findings are similar to hunting. Loch Alva and Central Highlands effort would not transfer because of a lack of alternatives.
- **Snowmobiling** – Adjacent lands would not be affected in most areas. Alternative routes may not be available at Jacquet River, Central Highlands and Kennedy Lakes.
- **ATV** – Similar to snowmobiles adjacent land could absorb displaced activity in most cases. Alternative routes to main trails may not be available at Jacquet River.

5.1 Impact of Protected Areas on Lands Adjacent to the Protected Areas

Jacquet River

Adjacent Land Tenure	Crown land is adjacent to most of the area except for private land that is located on northeast side.
Hunting	Limited hunting to be displaced.
Fishing	Fishing effort could be transferred to surrounding area without major impact.
Snowmobiling	Major groomed thoroughfare could be difficult to replace on adjacent lands in immediate vicinity.
ATV	Planned ATV organized trails could be affected without suitable replacement on adjacent lands in immediate vicinity.

Central Highlands

Adjacent Land Tenure	Crown land surrounds all of Protected Area, with the Mount Carleton Provincial Park on the west side.
Hunting	Limited hunting to be displaced.
Fishing	Most fishing occurs on the river associated with canoeing activity. Will not transfer to adjacent area.
Snowmobiling	Main trail goes along the river road. Obvious alternatives do not appear to exist Governors Lodge could be at risk as activity levels could decrease on adjacent lands.
ATV	ATV association has interest in area as a location for organized trails. Similarly to snowmobiles alternative may not exist.

Kennedy Lakes

Adjacent Land Tenure	Crown land on northeast and south sides of the area. Private land on west side (large industrial freehold); also one large piece of freehold in the middle excluded from the Protected Area.
Hunting	Hunting is limited. Adjacent areas on Crown land have good road access and can absorb displaced hunting pressure.
Fishing	Adjacent areas on Crown land have good road access and can absorb displaced fishing pressure.
Snowmobiling	Haul road on west side is used for north south travel, if access lost no alternate north south route currently exists in vicinity. Could lead to overall drop in snowmobiling in areas adjacent.
ATV	Lots of road network available that can absorb additional utilization.

Canaan Bog

Adjacent Land Tenure	Crown land surrounds the Protected Area except for northeast side where there is private land. Canaan River Game Management Area to the south.
Hunting	Currently lots of deer and moose hunting in the area. Areas to the south and north are both accessible and will likely absorb much of the displaced hunting effort. Level of hunting in the surrounding area will be more intense than at present. Accessibility is as good or better.
Fishing	There are several waterways to the north and the Canaan River and its associated tributaries to the south. These areas will absorb additional fishing pressure. Accessibility is as good or better.
Snowmobiling	No main groomed trails in the Protected Area. Road network in adjacent area can easily absorb additional activity.
ATV	Road network in adjacent area can easily absorb additional activity.
Camps	Several camps in northeast corner will transfer hunting and fishing pressure to immediate areas adjacent.

Grand Lake Meadows

Adjacent Land Tenure	Protected Area is comprised of two distinct separate areas. To the north, the Area is bounded by Crown on the north side, a UNB forest holding and the Burpee Game Management Area and the Federal Government's Acadia Forest. The southern section is in pieces mixed with private land holdings.
Hunting	Big Game – a mid range level of effort that could be accommodated in adjacent areas of Crown. Waterfowl hunting is a very major activity on the southern section. Transfers of activity would take place to adjacent private lands. Quality of experience would deteriorate as adjacent lands become overcrowded
Fishing	Adjacent areas would not be affected by much transfer of effort.
Snowmobiling	Lots of suitable areas on adjacent lands.
ATV	Lots of suitable areas on adjacent lands.

Nerepis Hills

Adjacent Land Tenure	Area is divided into two separate parcels. To the north, the Protected Area is on Camp Gagetown's landbase. Adjacent land to this area includes additional DND lands as well as private land. The parcel to the south has Crown land in the southwest edge; Loch Alva Protected Area to the south edge. Private lands to the north divide the two parcels.
Hunting	Hunting is fairly active in both the northern and southern parcel and adjacent areas are comparable. Much of the effort would transfer.
Fishing	For the southern parcel area adjacent to the Protected Area offers comparable opportunity. Additional pressure will be placed on these areas. For the northern parcels, comparable opportunities do not appear to exist.
Snowmobiling	Adjacent areas could absorb additional activity.
ATV	Adjacent areas could absorb additional activity.

Loch Alva

Adjacent Land Tenure	Crown land on north and west sides; Nerepis Hills to the north of the Protected Area. Private land on south and east sides.
Hunting	Considerable hunting activity in the area. Only real option for hunting is in area to the west where there is a good road network. Not all effort will transfer but nevertheless will lead to more crowded hunting in the area to west reducing the experience for all participants.
Fishing	Considerable fishing in Protected Area. Adjacent area simply does not offer the same quality of experience. Pressure might increase but will not accommodate all displaced effort.
Snowmobiling	Adjacent areas on Crown land can absorb.
ATV	Much of adjacent land is private. Not all activity will transfer to area in the west.

Caledonia Gorge

Adjacent Land Tenure	Mainly Crown land on west side, private land to south, north and eastern sides.
Hunting	Limited hunting to be displaced, adjacent land can easily absorb.
Fishing	Limited fishing to be displaced, adjacent land can easily absorb.
Snowmobiling	Most main trails run in proximity to area as opposed to through area. Where there is intrusion, alternative routes are available.
ATV	Surrounding areas could absorb current level of activity.

6.0 NET IMPACTS

Our aim in this section is to summarize the findings on the various benefits and costs and to assess whether there is a net impact. We begin with the findings of Section 3.0 which provide an analysis of the socio-economic impacts of introducing the eight Protected Areas. Impacts are treated as the change in the quantity or quality of each ecosystem service or activity that occurs with, as opposed to without, the Protected Areas. Impacts arise because under the working assumption for this study, some of the output of some ecosystem services will increase while others will decrease because they are no longer permitted in the Protected Areas. Increases in ecosystem services are referred to as the benefits of protection; reductions in ecosystem services are costs. Strictly speaking, they are mainly opportunity costs in the sense that they represent ecosystem services that New Brunswick gives up in order to produce the benefits of protection. In addition, there are some monetary or budgetary costs associated with setting up and managing the Protected Areas.

To the extent possible, benefits and costs were expressed in quantitative or monetary terms. Where this was not possible, a qualitative description was given. In all cases, the approach taken was to assess whether an identified benefit or cost was incremental or redistributive. That is, as far as possible, we want to reach a conclusion about whether introducing protection results in a net increase or decrease for each ecosystem service and a net benefit or a net cost overall. Section 6.2 provides a summary analysis of the net impacts by ecosystem service.

6.1 Ecosystem Service Net Impacts

The following table examines net impacts that result from introducing new activities or expanding existing activities and discontinuing existing activities in Protected Areas.

Activity	Total Impact	Incremental/ Redistribution	Net Impact
Biodiversity	...	...	...
Comment:	Captured through the analysis of the various ecosystem services		
Carbon	About $1.43 million per year.	Only partly incremental, since PA lands would still be forested without protection.	No precise estimate possible.
Comment:	Benefit is global in nature; only partially captured in New Brunswick; can be considered in terms of Canada's commitments on global climate change.		
National and International Commitments	Add 159,305 ha to New Brunswick's Protected Areas network.	Incremental	159,305 ha
Comment:	Setting up 8 Protected Areas contributes to Canada's commitment for a national system of Protected Areas; expands New Brunswick's Protected Area to about 3.5% of provincial land base.		
Education	Small impact; information brochures and website only.	Incremental	Small impact; information brochures and website only; cost of about $15,000.
Comment:	Areas are not expected to be heavily used for public education purposes		
Research	PAs available for comparative and baseline research on undisturbed areas.	Incremental gain	New opportunities for ecosystem research.
Comment:	PAs can serve as unmanaged benchmarks for measuring changes in province's natural environment.		
Eco-tourism	There is virtually no use made of existing areas for eco-tourism.	Any increase in eco-tourism use will be incremental.	Good potential in the sense that eco-tourist parties tend to stay longer and spend almost twice as much per trip (about $900) as non-nature tourist parties.
Comment:	The establishment of Protected Areas represent an opportunity for the emergence of more nature-based tourism. While any activity that can be generated will be incremental, the fact that none of the areas represent truly world class natural features will limit the overall potential impact.		
Water Supply	Two existing water supply areas would be included in three PAs.		Little or no incremental gains.
Comment:	Existing water supplies already operate with higher levels of protection (wider buffers, etc.) than regular forest land; small increase in security of supply is possible.		

Activity	Total Impact	Incremental/ Redistribution	Net Impact
Susceptibility to Pests and Fires	No substantial changes identified		
Comment:	Littie change in incidence in forest fires or pests and disease in PAs expected; costs of dealing with either would remain within normal parameters.		
Non Measured Benefits	Existence, bequest and option values all identified as possible values New Brunswickers will attach to the PAs.	Likely to be incremental.	No specific values available based on New Brunswick data.
Comment:	Values estimated for other places and situations suggest existence, bequest and option values could be non-trivial for the PAs.		
Forest Harvesting	97 jobs	80-100% of jobs and income will be lost.	80 to 97 jobs lost
Comment:	Due to tight wood supply situation and fact most harvesting is done on piece rate by contractors who operate in certain areas, there will be a loss of jobs. The job loss will correlate closely to the percentage reduction in AAC. Impacts will be concentrated near Jacquet River, Kennedy Lakes and Canaan Bog as these areas account for 62% of AAC reduction.		
Sawmills	99 jobs	20-50% of jobs and income will be lost	20-50 jobs lost
Comment:	Loss of access to fibre will be evenly distributed across all licensees and sub-licenses. On average no mill should experience a reduction in wood supply greater than 2%. Small mills that have not been modernized are the most vulnerable. Other mills will either secure more expensive wood or will operate at lower plant utilization. Job loss is not likely to correlate directly to the loss of fibre.		
Pulp Mills	104 jobs	20-50% of jobs and income will be lost.	20-50 jobs lost
Comment:	See sawmill comment		
Hunting Resident	Total Expenditure: $800,000 Jobs - 15	70-80% of hunting effort will be redistributed to other areas.	$160,000-240,000 in lost expenditures. 3-5 jobs lost.
Comment:	For most of the Protected Areas, there are similar alternative hunting grounds available on Crown lands within a reasonable proximity. A few of the major hunting areas such as Loch Alva may not be in a position to transfer effort to alternative grounds.		
Hunting Non-Resident	Total Expenditure: $66,000 Jobs - 2	0-20% could be lost	$0-$15,000 lost in expenditures. 0-.5 jobs lost
Comment:	Bear outfitters may have to incur higher costs to bait bears in new locations if they are displaced from the Protected Areas. Unlikely they would give up any of the licenses they control.		
Sportfishing	Total Expenditure: $425,000 Jobs - 8		
Comment:	For most Protected Areas similar fishing opportunities are available nearby. Exceptions may be Loch Alva and Nerepis Hills.		

Activity	Total Impact	Incremental/ Redistribution	Net Impact
Trapping	Total annual value of trapping industry in New Brunswick over the past five years has ranged between $500,000 and $1 million. Protected Areas could account for about 10% or $50-$100,000.	Loss could be between 50 and 100%.	Loss will be between $25,000 and $50,000.
Comment:	Since most trappers work in areas which, by gentlemen's agreement, are exclusive to them it will be difficult for displaced trappers to move to new areas.		
Snowmobiling		Minimal reduction in activity at provincial level.	Limited loss.
Comment:	Alternative trails can be identified in close vicinity to Protected Areas should major through trails be closed. There could be some local businesses affected if trails are diverted away from current routes.		
ATV		Minimal reduction in activity at provincial level.	Limited loss.
Comment:	There is sufficient alternative trail network[illegible]oximity to all the Protected Areas that no net loss will be attrib[illegible] to a this activity. Jacquet River and Central Highlands could pose obstacles to formal trail development.		
Peat	There is a defined peat resource in the Canaan Bog with potential for development.	If production is not allowed, commercial value of the resource will be lost at some point in the future. There may be other optional resource available.	Indeterminate
Comment:			
Other Minerals	Main value relates to potential exploration activity. Ultimate impact would be the discovery of an economic mineral deposit.	Exploration programs are closely attached to the mineralization characteristics of a given area and the market circumstances of the day. If an area cannot be explored, it does not mean that a program will transfer to another area.	Virtually a 100 percent loss of a difficult to define opportunity
Comment:	Most Protected Areas seem to have very little potential to attract major exploration programs aside from Jacquet River, Central Highlands and Nerepis Hills may also result in a small net loss.		
Corridors	No impacts		
Comment:	Existing transmission lines, rail right of ways, gas distribution lines and roads will remain in place; no new corridors planned.		

Activity	Total Impact	Incremental/ Redistribution	Net Impact
Establishment and Administrative Costs	Initial boundary line marking about $375,000; annual cost of $60,00 starting in five years.	Cost estimates are incremental.	Initial boundary line marking about $375,000; annual cost of $60,00 starting in five years.
Comment:	It should be possible to reduce these costs by making maximum use of natural boundaries such as roads, county lines, rivers and streams and using digitized land base to create appropriate maps. No incremental enforcement costs as they can be absorbed within existing budgets; also make use of volunteers for some enforcement functions.		

6.2 Net Impacts Summary

Through the establishment of Protected Areas there are ecosystem services that will be enhanced and others whose values will be diminished.

The ecosystem services that will be enhanced include those services associated with value of the biodiversity, carbon sequestering, and the introduction of eco-tourism opportunities. In addition, Canada and New Brunswick will benefit from the action taken as it relates to various international agreements and obligations.

Under the working assumption used in this report, many of the commercial and recreational activities that currently take place inside the proposed Protected Areas will be prohibited with the declaration of protection. This will result in a variety of costs to society. The major costs will be borne by commercial activities such as those conducted by the forestry and mining industries. Various recreational pursuits such as hunting and fishing will also experience some loss.

Overall, it was not possible to measure all of the benefits and costs in monetary terms. Thus, the comparison of benefits with costs involves a mix of qualitative and quantitative measures. This means that New Brunswick decision-makers must determine if, in their judgement, the identified benefits associated with protection are worth the trade-offs or costs that will be incurred.

Finally, we wish to note that our analysis has been based on a defined set of boundaries. Although we have not completed a detailed assessment, it is possible that some adjustment to various Protected Area boundaries could serve to moderate or reduce the losses and potential losses imposed on the forestry and mineral industries.

REFERENCE LIST

Janet N. Abramovitz, "Putting a Value on Nature's 'Free' Services", *World Watch*, 11(1): pp. 10-19, 1998.

ADI Nolan Davis and Gardner Pinfold Consulting Economists Limited, *Assessment of Costs and Benefits of Protecting Drinking Water Sources*, Canada-Newfoundland Agreement Respecting Water Resource Management, Government of Newfoundland and Labrador Department of Environment and Environment Canada, March 1996.

ARA Consulting Group Inc., *Nova Scotia Nature Tourism Study*, Prepared for the Department of Economic Development and Tourism by the ARA Consulting Group Inc., July 1997.

Arbour Vitae Environmental Services Ltd., Woodrising Consulting Inc. & Peter Duinker, *Benefits of Afforestation Programs in Ontario, Quebec, and the Atlantic Provinces.*

Atlantic Canada Opportunities Agency, *The Wood Industry in Atlantic Canada: A Focus on Value-Added*, November 1998; http://www.acoa.ca/enlish/library/reports/wood_frame.html

Atlantic Provinces Economic Council, *The Economic Impact of the Forest Industry on the Nova Scotia Economy*, March 2000.

Basic Design Associates Ltd., *A Tourism Strategy for Riverside Albert Fundy Historic Village on Shepody Bay*, December 1997.

Joshua T. Bishop (ed.), *Valuing Forests; A Review of Methods and Applications in Developing Countries*, International Institute for Environment and Development, July 1999.

W.K. Bond et al., *Wetland Evaluation Guide: Final Report of the Wetlands are Not Wastelands Project*, North American Wetlands Conservation Council (Canada), Sustaining Wetlands Issues Paper, No. 1992-1, March 1992.

Roy Brouwer, "Environmental Value Transfer: State of the Art and Future Prospects", *Ecological Economics*, 32, pp. 137-152, 2000.

Canadian Council of Forest Ministers, *Compendium of Canadian Forestry Statistics 1998*; http://nfdp.ccfm.org/frames2_e.htm

Canadian Pulp and Paper Association, "1999 Annual Review"; http://www.open.doors.cppa.ca/english/cppa/rev99/10.html

Canadian Pulp and Paper Association, 'The Forest Industry in Canada - Quick Facts"; http://www.open.doors.cppa.ca/english/news/pw98.htm

Canadian Tourism Commission, "Adventure Travel & Ecotourism"; http://www.canadatourism.com/en/ctc/ctx/publications/main/viewsection.cfm?publication/D=222&subchapterID=

Barbara M.W. Carroll (ed.), *New Brunswick's Mineral Industry, 1998*, Mineral Resource Report 99-3, New Brunswick Department of Natural Resources and Energy, 1999.

Barbara M.W. Carroll (ed.), *Preliminary Review of New Brunswick's Mineral Industry, 1999*, Mineral Resource Report 2000-1, New Brunswick Department of Natural Resources and Energy, 2000.

CIBC, "Outlook for Manufacturing: Resource-based Goods", February 14, 2000; http://www.cibc.com/english/business-services/economics/67_INDUSTRY/index_main.html

CIBC, "Outlook for Agriculture, Fishing & Extractive Industries", February 14, 2000; http://www.cibc.com/english/business-services/economics/67_INDUSTRY/index_main.html

Robert Constanza et al, "The Value of the World's Ecosystem Services and Natural Capital", *Nature*, Volume 387, No. 6230, 1997; http://scilib.ucsd.edu/~pcchau/ENVR30/reader/costanza-pdf

Department of Fisheries and Oceans, *1995 Survey of Recreational Fishing in Canada*, Economic and Commercial Analysis Report No. 154, DFO, December 1997.

Mohammed Dore, Mark Johnston and Harry Stevens, "An Ecological-Economic Analysis of the Role of Canadian Forests in Mitigating Global Climate Change", *Journal of Sustainable Forestry*, Vol. 5, No 1/2, 1997, pp. 199-206.

Eagles, Paul F. "International Ecotourism Management Using Australia and Africa as Case Studies", Paper prepared for the IUCN World Commission on Protected Areas in the 21st Century: From Islands to Networks, November 1997; http://www.ahs.uwaterloo.ca/rec/ecotour.htm

ESG International, *Trails in Ontario: Economic Benefits*, Presentation for Ontario Trails Council.

Samuel Fankhauser, *Value Climate Change: The Economics of the Greenhouse*, Earthscan Publications Limited, 1995.

Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians, *The Importance of Nature to Canadians: The Economic Significance of Nature-Related Activities*, Environment Canada, 2000.

Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians, *The Importance of Nature to Canadians: Survey Highlights*, Environment Canada, 2000.

Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians, *The Importance of Nature to Canadians: A User's Guide to the Methodology of a 1996 Survey*, Environment Canada, 2000.

FGA Consultants Ltd., *Impacts of the Forest Industry on the New Brunswick Economy*, Prepared for New Brunswick Forest Products Association, Inc., August 1998.

Fraser Institute, *Annual Survey of Mining Companies 1999/2000*

Gardner Pinfold Consulting Economists Limited, *Best Practices for Sustainable Tourism Communities*, Report prepared for ACOA, April 2000.

Gardner Pinfold Consulting Economists Limited, *Non-Timber Benefits for Private Woodlots in Prince Edward Island*, Prepared for Forestry Canada, July 1993.

Ralph Goodale, "Speech to the World Mines Ministries Forum", March 9, 2000; http://www.NRCan.gc.ca/css/imb/hqlib/200016e.htm

Michael J.B. Green and James Paine, "State of the World's Protected Areas at the End of the Twentieth Century", Paper presented at IUCN World Commission on Protected Areas Symposium on 'Protected Areas in the 21st Century; From Islands to Networks'", November 24-29, 1997.

Mark Harmon, William Ferrell and Jerry Franklin, "Effects on Carbon Storage of Conversion of Old Growth Forests to Young Forests", *Science*, Vol. 247 (9), pp. 699-702, February 1990.

V. H. Heywood (ed.), *Global Biodiversity Assessment*, Cambridge University Press, 1995.

Industry Canada, Forest, Metal and Building Products Branch, *Market Trends and Prospects*, 57th Session ECE Timber Committee, September 1999.

Stephen M. Jasinski, "Mineral Commodity Summaries – Peat", U.S. Geological Survey; http://searchpdf.adobe.com/proxies/2/41/50/8.html

Dennis King and Lisa A. Wainger, *Assessing the Economic Value of Biodiversity Using Indicators of Site Conditions and Landscape Context*, Organization for Economic Cooperation and Development Workshop on Benefit Valuation of Biodiversity Resources, Paris, France, October 1999.

W.A. Kurz, M.J. Apps, S.J. Beukema and T. Lekstrum, "20th century carbon budget of Canadian Forests", *Tellus 47B*: pp. 170-177, 1995.

Werner A. Kurz and Michael J. Apps, "Contribution of Northern Forests to the Global C Cycle Using Canada as a Case Study", Water, Air and Soil Pollution, 70: pp. 163-176, 1993.

Rodolphe Lamarche et Jean Yves Daigle, *L'industrie de la Tourbe au Nouveau-Brunswick: Naissance, Développement et Perspectives D'avenir*, Institut Canadien de Recherche Sur Le Développement Régional, 1999.

Judy Loo and M. Gorman (eds.), *Protected Areas and the Bottom Line: Proceedings of the 1997 Conference of the Canadian Council on Ecological Areas*, September 14-16, 1997, Natural Resources Canada, Canadian Forest Service,1999.

Brian W. Mackenzie and Michael D. Doggett, "The Current Outlook for Canada's Base Metals and Gold", *CRS Perspectives*, 43: pp. 23-31, 1993.

Malcolm J. McLeod, *Mineral Resource Report 5: Geology, Geochemistry, and Related Mineral Deposits of the Saint George Batholiths; Charlotte, Queens, and Kings Counties, New Brunswick*, New Brunswick Department of Natural Resources and Energy, 1990.

Michael M'Gonigle et al., "Comprehensive Wilderness Protection in British Columbia: An Economic Impact Assessment", 68(3): pp. 357-364.

Mining Association of Canada, "Mining in Canada – Facts and Figures"; http://www.mining.ca/english/publications/fnf98.pdf

Ted Mosquin, Peter G. Whiting, Don E. McAllister, *Canada's Biodiversity: The Variety of Life, Its Status, Economic Benefits, Conservation Costs and Unmet Needs*, Canadian Museum of Nature, 1995.

Tom Murray and Julie Singleton, *Popple Depot Forest Ecosystem Design Project*, January 1996.

Natural Resources Canada, Canadian Forestry Service, *The State of Canada's Forests 1998-1999*, "Protected Areas: Safeguarding Canada's Biodiversity"; http://www.nrcan.gc.ca/cfs/proj/ppiab/sof/sof99/spart1.shtml

Natural Resources Canada, Minerals and Metals Sector, Economic and Financial Analysis Branch, *Canada's Minerals and Metals Industry – An Economic Overview*, October 1999; http://www.nrcan.gc.ca/mms/pdf/econo-e.pdf

New Brunswick Department of Economic Development, Tourism and Culture, *1998-1999 Annual Report*; http://www.gnb.ca/edt/review/index.asp.

New Brunswick Department of Economic Development, Tourism and Culture, *2000 Outfitters Directory*.

New Brunswick Department of Economic Development, Tourism and Culture, CNB News Release, "Another Good Tourism Season for New Brunswick", August 30, 1999; http://www.gov.nb.ca/cnb/news/bnb/1999e1163et.htm.

New Brunswick Department of Economic Development, Tourism and Culture, CNB News Release, "Record-breaking Tourism Season in New Brunswick", November 10, 1999; http://www.gov.nb.ca/cnb/news/bnb/1999e1499et.htm.

New Brunswick Department of Economic Development, Tourism and Culture, CNB News Release, "Step Forward for Appalachian Range Tourism Destination", May 3, 1999; http://www.gov.nb.ca/cnb/news/bnb/1999e0619et.htm.

New Brunswick Department of Natural Resources and Energy, *1998-99 Annual Report*; http://www.gnb.ca/dnre/nre9899ar.pdf.

New Brunswick Department of Natural Resources and Energy, *A Wildlife Policy for New Brunswick*, September 1995.

New Brunswick Department of Natural Resources and Energy, "Mount Carleton", brochure.

New Brunswick Department of Natural Resources and Energy, *New Brunswick Big Game Harvest Reports 1998*.

New Brunswick Department of Natural Resources and Energy, *New Brunswick Furbearer Harvest Report 1998-99*.

New Brunswick Department of Natural Resources and Energy, *New Brunswick Mineral Occurrence Database.*

New Brunswick Department of Natural Resources and Energy, *New Brunswick Wildlife Management Zones*, Third edition.

New Brunswick Department of Natural Resources and Energy, *Timber Utilization Survey for the Year 1998*, April 1, 1998 to March 31, 1999.

New Brunswick Mining Association, *Staking a Claim for the Future; A Brief on the New Brunswick Mineral Industry*, October 1999.

New Brunswick sub-Licensee Forestry Alliance, *Directory of Members*, 1998.

Tom O'Neil, "Bank of Montreal Outlook 2000 – Commodity Markets"; http://www.bankofmontreal.com/economic/regular/outcomm.htm

David Pearce and Domonic Moran, *The Economic Value of Biodiversity*, IUCN – The World Conservation Union, 1994.

Peat Research and Development Center Inc., "New Brunswick Peat Industry Review"; http://crdt.cus.ca/english/info/industry.htm.

PFK Consulting, *Analysis of Economic Impacts of the Northern Central Rail Trail*, Prepared for Maryland Greenways Commission, Maryland Department of Natural Resources, June 1994; http://www.bts.gov/smart/cat/430.html.

Price Waterhouse Coopers, *The Forest Industry in Canada*, 1998 and other annual reports.

Remsoft Inc., *Wood Supply Issues and Protected Areas in New Brunswick; Scenarios and Impacts of Implementing Candidate Protected Areas on Crown Lands in New Brunswick*, A Preliminary Analysis Carried out on behalf of World Wildlife Fund Canada and the New Brunswick Protected Natural Areas Coalition, March 1999.

Rivers and Trails Conservation Assistance, National Park Service, *Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors*, National Park Service, 1990.

Alicia M. Schutt, *30 Years in the Making: A Comprehensive Economic Impact and User Study of the Bruce Trail, Ontario, Canada*, A Report for the Bruce Trail Association, February 1997.

Andrew Secord, *Forest Industry Employment and Protected Areas in New Brunswick*, Prepared for the NB Protected Natural Areas Coalition and World Wildlife Fund Canada, March 1999.

Roger A. Sedjo, "Harvesting the Benefits of Carbon Sinks", Resources for the Future, 122: pp. 10-13, 1998.

Gilles Simard, "Wood Manufacturers Have Been Stimulated By the Strength of the Domestic Market", Statistics Canada, Manufacturing, Construction and Energy Division, 1999; http://www.statcan.ca

R. David Simpson, Rodger A. Sedjo, and John W. Reid, "Valuing Biodiversity for Use in Pharmaceutical Research", *Journal of Political Economy*, 104(1): pp. 163-185, 1996.

Cynthia Stacey and Simon Mitchell, *Recreational Use Assessment of the St. Croix International Waterway: Preliminary Findings from a Mail Survey of Waterway Users Conducted in the Summer of 1999*, Prepared for New Brunswick Environmental Trust Fund, March 2000.

Statistics Canada, *General Review of the Mineral Industries: Mines, Quarries and Oil Wells*, 1996 Annual Census of Mines; http://www.statcan.ca:80/english/freepub/26-201-XIB/0009626-201-XIB.pdf

Statistics Canada, *General Review of the Mineral Industries: Mines, Quarries and Oil Wells*, 1997 Annual Census of Mines; http://www.statcan.ca:80/english/freepub/26-201-XIB/0009626-201-XIB.pdf

Statistics Canada, "Production and Value of Leading Minerals", http://www.statcan.ca:80/english/Pgdb/Economy/Primary/prim24.htm

John Talberth and Karen Moskowitz, *The Economic Case Against National Forest Logging*, Prepared for the National Forest Protection Alliance, December 1999.

Texas Parks and Wildlife Department, *Texas Coastal Birding Trail, Central Texas Coast*.

Toronto Dominion Economics, "TD Quarterly Economic Forecast"; http://www.tdbank.ca/tdeconomics/economic_forecasts/index.html

Tourism New Brunswick, *Year 2000: Focus on the Future*, February 2000.

G. Cornelius Van Kooten, "Economics of Protecting Wilderness Areas and Old-Growth Timber in British Columbia", *The Forestry Chronicle*, 71(1): pp. 52-58.

G.C. Van Kooten, Louise M. Arthur and W.R. Wilson, "Potential to Sequester Carbon in Canadian Forests; Some Economic Considerations", *Canadian Pubic Policy*, XVIII: pp. 127-138, 1992.

Visit Florida's Research Office, "Nature-Based Activities and the Florida Tourist", May 1999.

World Wildlife Fund, *Canada's Commitment to Forest Protected Areas: Forests for Life*, A WWF Status Report; http://www.panda.org/canadianforests/canada48.pdf

APPENDIX 1

CONTACT LIST

CONTACT LIST

Terry Ahern, British Columbia Parks (Ministry of Environment, Lands and Parks)
Bertin Allard, Mount Carleton Provincial Park
Ross Antworth, NB Snowmobile Federation
André Arpin, Centre Echo Restigouche
Myrtle Baitman, Canadian Wildlife Service
Dave Baardsen, DNRE
Mel Blizzard, DNRE
Luc Boucher, Coalition Stillwater (Protected Areas Stakeholder Committee)
Mike Brown, DNRE
Max Cator New Brunswick Forest Products Association
Francois Chiasson, DNRE
Roberta Clowater, NB Protected Natural Areas Coalition (Protected Areas Stakeholder Committee)
Wayne Clowater, DNRE
Kathryn Collet, DNRE
Harry Collins, Miramichi River Environmental Assessment Committee
Peter Cronin, DNRE
Darwin Curtis, DNRE
Conway Davis, NB Wildlife Federation (Protected Areas Stakeholder Committee)
Bob Dick, DNRE
Peter Downey, DNRE
Lee Dufour, DNRE
David Dunn, DNRE
Lucy Dyer, Nature Trust of New Brunswick (acting for Jessie Davies, Nature Trust of New Brunswick) (Protected Areas Committee Member)
Bill Ensor, DNRE
Reg Fredericks, New Brunswick Outfitters Association
Jim Galvert, DNRE
Jane Garbutt, Business New Brunswick (formerly DEDTC)
Pascal Giasson, DNRE
Geoff Harding, Ducks Unlimited
Ron Harris, British Columbia Parks (Ministry of Environment, Lands and Parks)
Rao Irrinki, DNRE
Gary Jochelman, Business New Brunswick (formerly DEDTC)
Sheldon Johnson, DNRE
Susan Johnson, DNRE
David Jones, DNRE
Patrick Jones, CFBN Gagetown
Jim Lawless, J.D. Irving, Chipman
Paul Leahey, New Brunswick Alliance of Professional Outfitters
John LeDuc, Nova Scotia Department of the Environment
Keith MacConnachie, Canadian Wildlife Service
Scott MacDonald, NB Trails Council Inc.
M. David MacFarlane (Protected Areas Stakeholder Committee)
Andrew MacInnis, Ducks Unlimited Canada
Dennis Mallet, New Brunswick Peat Producers Association
Martin Marshall, DNRE
Rino Martin, NB ATV Federation
Rory Matchett, Canoe New Brunswick
Pat McCarthy, Bowater

Stephen McCutcheon, DNRE
Sam McEwan, DNRE
Jim McGlaughlin, DNRE
Malcom McLeod, DNRE
Mike McPhee, Mount Carleton Wilderness Camps
Kathy McPherson, Ontario Parks (Ministry of Natural Resources)
John Memberket, N.S. DNR
Randy Mersereau, New Brunswick Trappers Association
Terry Mersereau, Northeast Explorations
Ian Methven, University of New Brunswick (Protected Areas Stakeholder Committee)
Bruce Mitton, NB Prospectors & Developers Association
Gary Moore, DNRE
Barry Nelson, DNRE
Doug Nichols, DNRE
Don O'Donnell, New Brunswick Guides Association
Phil Ossinger, Business New Brunswick (formerly DEDTC)
David Oxley, J.D. Irving Limited, NB Forest Product Association (Protected Areas Stakeholder Committee)
Darrell Paul, Union of New Brunswick Indians
David Peterson, New Brunswick Department of the Environment, Saint John
Dave Plante, New Brunswick Mining Association (Protected Areas Stakeholder Committee)
Yvon Poitras, NB Sub-Licensee Forestry Alliance (Protected Areas Stakeholder Committee)
Jacques Rousseau, DNRE
Sara Richard, DNRE
Joel Richardson, Business New Brunswick (formerly DEDTC)
Olivier Robichaud, DNRE
Bernard Savoie, New Brunswick Department of the Environment, Bathurst
Nancy Sears, Fundy Hiking and Nature Tours
Gilles Souci, Eel River Bar First Nations Aboriginal Heritage Gardens
George Scott, Ontario Parks (Ministry of Natural Resources)
Pam Seymour, DNRE
Elizabeth Spatz DeVito, NB Prospectors & Developers Association (Protected Areas Stakeholder Committee)
John Stears, Loch Alva Camp Owners Association
Clinton St. Peter, DNRE
Mike Sullivan, DNRE
Julius Tarjan, DNRE
Mike Taylor, Slam Explorations, NB Prospectors & Developers Association
Jacques Thibault, DNRE
Michel Vachon, Première Horticulture Ltée
Ken Whaley, Mactaquac Mining
Greg Watling, DNRE
Steve Webb, British Columbia Parks (Ministry of Environment, Lands and Parks)
Gary Woods, Noranda Inc.
Vince Zelazny, DNRE

Note: In some cases where group meetings were held, not all participants were identified by name.

APPENDIX 2

FORESTRY

SCHEDULE F - 2000
License No. 1 / Permis N° 1 - Upsalquitch
Annual Allocation of Timber From Crown Lands (m3 / year)
Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)
Licensee / Titulaire: Bowater Maritimes Inc.

DRAFT

Adrien Arsenault Scierie Ltee	30,790	--	--	--	--	30,790	--
Atlantic Pressure Treating Limited	--	240 [a]	--	--	--	240	--
Av Cell Inc.	--	--	--	144,950	--	144,950	10,000
Bowater Maritimes Inc.	274,700	--	--	--	--	274,700	--
Deniso Lebel Inc.	23,015	--	--	--	--	23,015	--
Eagle Forest Products Ltd.	--	--	--	55,170	--	55,170	--
Groupe Savoie Inc.	--	--	--	60,760 [b]	--	60,760	(25,000)
H.T.M. Industries Inc.	--	--	--	10,000 [c]	--	10,000	(10,000)
J.S. Murray & Sons Ltd	480	1,420	--	--	--	1,900	--
Kedgwick Lumber Co. Ltd.	--	--	1,600 [d]	--	--	1,600	--
Les Cedres-Balmoral	--	--	5,040 [e]	--	--	5,040	--
Nelson Forest Products Inc.	2,850	--	--	1,450	--	4,300	--
North American Forest Product (Belanger)	27,940	470	--	--	--	28,410	--
North American Forest Products Ltd.	7,765	--	1,140	--	--	8,905	--
Smurfit-Stone Container Corp.	--	--	--	34,405 [f]	--	34,405	25,000
First Nations	19,760	120	420	10,000	--	30,300	--
Total / Totale	**387,300**	**2,250**	**8,200**	**316,735**	**0**	**714,485**	

*ALL TREELENGTH ALLOCATIONS LESS VENEER UNLESS OTHERWISE NOTED
*TOUTES LES ALLOCATIONS DE TRONCS ENTIERS SAUF QUE LE BOIS PLACAGE À MOINS D'INDICATION CONTRAIR

a - Red pine poles. / Poteaux pin rouge.
b - Includes 10 650 m3 aspen, 39 530 m3 hardwood pulpwood, and 10 580 m3 hardwood logs. / Comprend 10 650 m3 de tremble, 39 530 m3 de bois à pâte de feuillus, 10 580 m3 billes de feuillus.
c - Pulpwood quality. / Qualité de bois à pâte.
d - Treelength. / D'arbres entiers.
e - Includes 1 040 m3 sawlog quality and 4 000 m3 shingle quality. / Comprend 1 040 m3 qualité des billes, 4 000 m3 qualité bois à bardeaux.
f - Includes 24 405 m3 aspen. / Comprend 24 405 m3 de tremble.

SCHEDULE F - 2000
License No. 2 / Permis N° 2 - Nepisiguit
Annual Allocation of Timber From Crown Lands (m3 / year)
Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)
Licensee / Titulaire: Smurfit-Stone Container Corp.

DRAFT

Adrien Arsenault Scierie Ltee	4,690	55	--	--	--	4,745	--
Atlantic Pressure Treating Limited	--	20[a]	--	--	--	20	--
Chaleur Sawmills Associates	66,005	420	830	960	--	68,215	--
Groupe Savoie Inc.	--	--	--	3,650	--	3,650	--
Herbert M. Knowles	11,025	310	120	--	--	11,455	--
Legacy, J. C.	250	--	--	--	--	250	--
Les Cedres Balmoral	--	--	2,370[b]	--	--	2,370	--
Moulin McGraw Sawmills Ltd.	6,695	--	--	--	--	6,695	--
Moulin Poirier Ltee	--	--	--	680[c]	--	680	--
Nelson Forest Products Inc.	2,180	--	--	1,930[d]	--	4,110	--
North American Forest Product (Belanger)	14,990	290	--	--	--	15,280	--
Repap New Brunswick (G&S)	50,770[e]	--	--	--	--	50,770	--
Smurfit-Stone Container Corp.	121,030	--	--	85,305[f]	--	206,335	--
First Nations	14,870	50	180	3,500	--	18,600	--
Total / Totale	**292,505**	**1,145**	**3,500**	**96,025**	**0**	**393,175**	

*ALL TREELENGTH ALLOCATIONS LESS VENEER UNLESS OTHERWISE NOTED
*TOUTES LES ALLOCATIONS DE TRONCS ENTIERS SAUF QUE LE BOIS PLACAGE Ã MOINS D'INDICATION CONTRAIRE

a - Red pine poles. / Poteaux pin rouge.
b - Includes 280 m3 sawlog quality and 2 090 m3 shingle quality. / Comprend 280 m3 qualité des billes. 2 090 m3 qualité bois à bardeaux.
c - Aspen. / Tremble.
d - Includes 1 400 m3 of aspen. / Comprend 1 400 m3 de tremble.
e - Includes 36 165 m3 pulpwood and 14 605 m3 treelength less veneer. / Comprend 36 165 m3 bois à pâte. 14 605 m3 d'arbres entiers moin billes de placage.
f - Hardwood includes 22 795 m3 of aspen. / Feuillus comprend 22 795 m3 de tremble.

SCHEDULE F - 2000
License No. 3 / Permis N° 3 - Lower Miramichi
Annual Allocation of Timber From Crown Lands (m3 / year)
Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)
Licensee / Titulaire: Repap New Brunswick (G&S)

DRAFT

Ashley Colter (1961) Ltd. (F'ton)	14,015	--	--	--	--	14,015	--
Atlantic Pressure Treating Limited	--	220 [a]	--	--	--	220	--
Blackville Lumber Inc.	98,500	--	--	--	--	98,500	--
Blissfield Lumber Ltd.	--	--	245 [b]	--	--	245	--
Bourque Firewood Ltd.	--	--	--	--	240	240	--
C & V Industries	--	--	910	--	--	910	--
Capital Forest Products Inc.	4,120	--	--	--	--	4,120	--
Clair Industrial Development Corp.Ltd.	--	--	530 [c]	--	--	530	--
Delco Forest Products Ltd.	5,260	--	--	--	--	5,260	--
Dickson's Sawmill	--	--	1,190	--	--	1,190	--
Doiron, Yvon	--	--	140 [d]	--	--	140	--
Eagle Forest Products Ltd.	--	--	--	92,740	--	92,740	--
Entreprises Austin Ltee	--	--	--	970 [e]	--	970	--
Eric Goguen & Sons Ltd.	7,330	--	--	--	--	7,330	--
H. A. Fawcett & Sons Ltd.	6,650	--	--	--	--	6,650	--
Hamilton Forestry Products	--	--	--	--	1,090	1,090	--
James Sparkes & Sons Ltd.	--	--	--	--	1,110	1,110	--
Leger Firewood Ltd.	--	--	--	1,260 [e]	--	1,260	--
Nelson Forest Products Inc.	12,385	3,050	--	3,190 [f]	--	18,625	--
Newcastle Lumber Co.Ltd.	3,540	1,510	--	--	--	5,050	--
Ouellet Cedar Inc.	--	--	2,550 [d]	--	--	2,550	--
R. F. Sadler Ltd.	--	--	--	970	--	970	--
Repap New Brunswick (G&S)	110,005	--	--	--	--	110,005	--
Repap New Brunswick (K)	80,410	7,100 [g]	--	--	--	87,510	--
Russell & Swim Limited c/o J.D. Irving	--	4,595	--	--	--	4,595	--
Seacoast Fishing Supply Ltd.	--	--	--	225	--	225	--
SWP Industries (Blackville)	--	--	2,410	--	--	2,410	--
Underhill Forest Products Ltd.	--	--	2,455	580	--	3,035	--
Veneer Products of NB (1981) Ltd.	--	--	--	450	--	450	--
First Nations	17,880	860	540	3,300	120	22,700	--
Total / Totale	**360,095**	**17,335**	**10,970**	**103,685**	**2,560**	**494,645**	

a - Red pine poles. / Poteaux pin rouge.
b - Treelength. / D'arbres entiers.
c - Includes 490 m3 shingle quality and 40 m3 sawlog quality. / Comprend 490 m3 qualité bois à bardeaux. 40 m3 qualité des billes.
d - Shingle quality. / Qualité bois à bardeaux.
e - Fuelwood. / Bois de chauffage.
f - Includes 2 220 m3 aspen. / Comprend 2 220 m3 de tremble.
g - Pine is of pulpwood quality. / Pin de qualité convenant à la pâte.

SCHEDULE F - 2000
License No. 4 / Permis N° 4 - Upper Miramichi
Annual Allocation of Timber From Crown Lands (m3 / year)
Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)
Licensee / Titulaire: Repap New Brunswick (K)

DRAFT

Licensee / Titulaire							
Ashley Colter (1961) Ltd. (F'ton)	4,925	--	--	--	--	4,925	--
Atlantic Pressure Treating Limited	--	40[a]	--	--	--	40	--
Av Cell Inc.	71,160[b]	--	--	--	--	71,160	--
Blackville Lumber Inc.	109,450	--	--	--	--	109,450	--
Blissfield Lumber Ltd.	--	--	1,185[c]	--	--	1,185	--
C & V Industries	--	--	360	--	--	360	--
Clair Industrial Development Corp.Ltd.	--	--	205[d]	--	--	205	--
Delco Forest Products Ltd.	10,860	--	--	--	--	10,860	--
Doiron, Yvon	--	--	95[e]	--	--	95	--
Eagle Forest Products Ltd.	--	--	--	81,565	--	81,565	--
Hamilton Forestry Products	--	--	--	--	95	95	--
J. D. Irving, Limited	62,200[b]	--	--	--	--	62,200	(35,000)
James Sparkes & Sons Ltd.	--	--	--	--	3,065	3,065	--
Juniper Lumber Company Ltd.	74,805[f]	--	--	--	--	74,805	(50,000)
Nelson Forest Products Inc.	13,690	195	--	4,420[g]	--	18,305	--
Newcastle Lumber Co.Ltd.	36,120[h]	--	--	--	--	36,120	(20,000)
Ouellet Cedar Inc.	--	--	1,000[e]	--	--	1,000	--
R. F. Sadler Ltd.	--	--	--	3,390	--	3,390	--
Repap New Brunswick (G&S)	47,440	--	--	--	--	47,440	40,000
Repap New Brunswick (K)	75,575	--	--	32,540	--	108,115	65,000
Russell & Swim Limited c/o J.D. Irving	--	7,100	--	--	--	7,100	--
SWP Industries (Blackville)	--	--	1,630	--	--	1,630	--
Underhill Forest Products Ltd.	--	--	1,345	--	--	1,345	--
Veneer Products of NB (1981) Ltd.	--	--	--	1,130	--	1,130	--
First Nations	27,340	390	305	4,000	165	32,200	--
Total / Totale	**533,565**	**7,725**	**6,125**	**127,045**	**3,325**	**677,785**	

a - Red pine poles. / Poteaux pin rouge.
b - Treelength less veneer. / D'arbres entier moin placage.
c - Treelength. / D'arbres entiers.
d - Includes 180 m3 shingle quality and 25 m3 sawlog quality. / Comprend 180 m3 qualité bois à bardeaux. 25 m3 qualité des billes.
e - Shingle quality. / Qualité bois à bardeaux.
f - Treelength less veneer. / D'arbres entiers moin placage.
g - Includes 1 030 m3 of aspen. / Comprend 1 030 m3 de tremble.
h - Includes 18 975 m3 treelength and 17 145 m3 sawlog material. Comprend 18 975 m3 d'arbres entier. 17 145 m3 qualité des billes.

SCHEDULE F - 2000
License No. 5 / Permis N° 5 - Kent
Annual Allocation of Timber From Crown Lands (m3 / year)
Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)
Licensee / Titulaire: Eagle Forest Products Ltd.

DRAFT

Atlantic Pressure Treating Limited	--	20[a]	--	--	--	20	--
Blissfield Lumber Ltd.	--	--	1,710[b]	--	--	1,710	--
Capital Forest Products Inc.	990	--	--	--	--	990	--
Colonial Fence Manufacturing Co.	--	--	950	--	--	950	--
Delco Forest Products Ltd.	17,950	--	--	--	--	17,950	--
Eagle Forest Products Ltd.	--	--	--	33,700	--	33,700	--
Gerald M. Price Ltd.	1,680	--	--	--	--	1,680	--
H. J. Crabbe & Sons Ltd.	2,840	1,230	--	--	--	4,070	--
J. D. Irving, Limited	9,480[c]	--	--	--	--	9,480	--
Lakeburn Lumber Ltd.	2,330	--	--	--	--	2,330	--
Nelson Forest Products Inc.	460	--	--	925[d]	--	1,385	--
Repap New Brunswick (G&S)	5,730	--	--	--	--	5,730	--
Repap New Brunswick (K)	10,530	--	--	--	--	10,530	--
Russell & Swim Limited c/o J.D. Irving	--	850	--	--	--	850	--
St. Ignace Sawmill Ltd.	--	--	1,140	--	--	1,140	--
T. P. Downey & Sons Ltd. (St. Anthony)	3,980[e]	--	--	--	--	3,980	--
First Nations	3,080	120	200	1,100	--	4,500	--
Total / Totale	**59,050**	**2,220**	**4,000**	**35,725**	**0**	**100,995**	

a - Red pine poles. / Poteaux pin rouge.
b - Treelength. / D'arbres entiers.
c - Treelength less veneer. / D'arbres entier moin placage.
d - Includes 925 m3 of aspen. / Comprend 925 m3 de tremble.
e - 2 175 m3 of which is treelength less veneer. / Dont 2175 m3 sont sous forme d'arbres entiers moin billes de placage.

SCHEDULE F - 2000
License No. 6 / Permis N° 6 - Queens-Charlotte
Annual Allocation of Timber From Crown Lands (m3 / year)
Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)
Licensee / Titulaire: J. D. Irving, Limited

DRAFT

Licensee / Titulaire	Spruce / Epinette / Sapin	Pine / Pin Rouge					
Ashley Colter (1961) Ltd. (F'ton)	4,180	--	--	--	--	4,180	--
Atlantic Pressure Treating Limited	--	1,610[a]	--	--	--	1,610	--
Bishop's Lumber Co. Ltd.	4,960	--	--	--	--	4,960	--
Blissfield Lumber Ltd.	--	--	2,090[b]	--	--	2,090	--
C & V Industries	--	--	1,360	--	--	1,360	--
Chipman Sawmill Inc.	11,390	2,440	--	4,840	605	19,275	--
Clair Industrial Development Corp.Ltd.	--	--	705[c]	--	--	705	--
Colonial Fence Manufacturing Co.	--	--	190	--	--	190	--
Dead River Ltd.(Sussex) c/o J.D.I.	16,020	960	--	--	--	16,980	--
Devon Lumber Co. Ltd.	26.015	--	--	--	--	26,015	--
Donald E. Beckett Ltd.	5,200	1,060	--	--	--	6,260	--
Eagle Forest Products Ltd.	--	--	--	10,370	--	10,370	--
F. C. Alexander Limited	9,065	1,600	--	--	--	10,665	--
Flakeboard Co. Ltd	--	--	--	6,680[d]	--	6,680	--
Frobisher Industries	--	--	--	2,000	--	2,000	--
H. J. Crabbe & Sons Ltd.	--	--	--	--	2,145	2,145	--
J. D. Irving, Limited	432,520	12,660	--	168,940	--	614,120	--
James Sparkes & Sons Ltd.	--	--	--	1,450	950	2,400	--
Lakeburn Lumber Ltd.	--	--	--	2,910[e]	--	2,910	--
Levesque, R.	--	--	1,850	--	--	1,850	--
Miramichi Hardwoods Limited	--	--	--	4,840	--	4,840	--
Nelson Forest Products Inc.	4,210	--	--	6,200[f]	--	10,410	--
Ouellet Cedar Inc.	--	--	3,630[g]	--	--	3,630	--
R. F. Sadler Ltd.	--	--	--	2,620	--	2,620	--
Russell & Swim Limited c/o J.D. Irving	34,300	37,080[h]	--	--	--	71,380	--
Salmon River Lumber Co.	5,240	--	--	--	--	5,240	--
SWP Industries (Blackville)	--	--	50	--	--	50	--
SWP Industries (Goldsmith)	--	--	4,180	--	--	4,180	--
SWP Industries Inc.	--	--	4,890	--	--	4,890	--
T. P. Downey & Sons Ltd. (St. Anthony)	4,550	--	--	--	--	4,550	--
Veneer Products of NB (1981) Ltd.	--	--	--	2,950	--	2,950	--
First Nations	29,250	1,850	1,000	6,900	200	39,200	--
Total / Totale	**586,900**	**59,260**	**19,945**	**220,700**	**3,900**	**890,705**	

a - Includes 950 m3 red pine poles and 660 m3 red pine treelength. / Comprend 950 m3 poteaux pin rouge. 660 m3 d'arbres entiers pin rouge.
b - Treelength. / D'arbres entiers.
c - Includes 680 m3 shingle quality and 25 m3 sawlog quality. / Comprend 680 m3 qualité bois à bardeaux. 25 m3 qualité des billes.
d - Full tree chips. / Copeaux d'arbres entiers.
e - Aspen. / Tremble.
f - Includes 3 290 m3 of aspen. / Comprend 3 290 m3 de tremble.
g - Shingle quality. / Qualité bois à bardeaux.
h - Includes 15 560 m3 residual harvest for next 3 years. / Comprend 15 560 m3 de bois récolte fortuitement au cours des trois prochaines années.

SCHEDULE F - 2000
License No. 7 / Permis N° 7 - Fundy
Annual Allocation of Timber From Crown Lands (m3 / year)
Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)
Licensee / Titulaire: Irving Pulp & Paper Limited

DRAFT

Licensee / Titulaire / Titulaire du permis	Spruce-Fir / Epinette-Sapin	White Pine / Pin Blanc	Red Pine / Pin Rouge	Hardwood / Feuillus	Softwood / Bois mou	Total	Unallocated Crown Timber / Bois de la Couronne non attribué
Atlantic Pressure Treating Limited	--	140 [a]	--	--	--	140	--
Bishop's Lumber Co. Ltd.	4,515	--	--	--	--	4,515	--
Blissfield Lumber Ltd.	--	--	1,420 [b]	--	--	1,420	--
Capital Forest Products Inc.	950	--	--	--	--	950	--
Chipman Sawmill Inc.	--	--	--	1,940	950	2,890	--
Dead River Ltd.(Sussex) c/o J.D.I.	7,080	2,070	--	--	--	9,150	--
Devon Lumber Co. Ltd. (F'ton)	19,730	--	4,080	--	--	23,810	--
Eagle Forest Products Ltd.	--	--	--	26,005	--	26,005	--
Flakeboard Co. Ltd	--	--	--	32,050 [c]	--	32,050	--
Frobisher Industries	--	--	--	970	--	970	--
Gerald M. Price Ltd.	9,720	--	--	--	--	9,720	--
Goguen, Leo	--	--	--	1,260 [d]	--	1,260	--
H. A. Fawcett & Sons Ltd.	35,155	--	--	--	--	35,155	--
Irving Pulp & Paper Limited	187,425	2,285	--	90,640	--	280,350	--
James Sparkes & Sons Ltd.	--	--	--	--	555	555	--
Lakeburn Lumber Ltd.	8,395	190	--	2,900 [e]	--	11,485	--
Nelson Forest Products Inc.	2,550	--	--	4,760 [f]	--	7,310	--
Russell & Swim Limited c/o J.D. Irving	--	11,425 [g]	--	--	--	11,425	--
Seacoast Fishing Supply Ltd.	--	--	--	240	--	240	--
T. P. Downey & Sons Ltd.	42,450	--	--	--	--	42,450	--
T. P. Downey & Sons Ltd. (St. Anthony)	5,460	--	--	--	--	5,460	--
Veneer Products of NB (1981) Ltd.	--	--	--	970	--	970	--
First Nations	17,370	580	300	5,300	50	23,600	--
Total / Totale	**340,800**	**16,690**	**5,800**	**167,035**	**1,555**	**531,880**	

a - Red pine poles. / Poteaux pin rouge.
b - Treelength. / D'arbres entiers.
c - Full tree chips. / Copeaux d'arbres entiers.
d - Fuelwood. / Bois de chauffage.
e - Aspen. / Tremble.
f - Includes 1 860 m3 of aspen. / Comprend 1 860 m3 de tremble.
g - Includes 4 440 m3 residual harvest for next 3 years. / Comprend 4 440 m3 de bois récolté fortuitement au cours des trois prochaines années.

SCHEDULE F - 2000
License No. 8 / Permis N° 8 - York
Annual Allocation of Timber From Crown Lands (m3 / year)
Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)
Licensee / Titulaire: St. Anne-Nackawic Pulp Co. Ltd.

DRAFT

Licensee / Titulaire / Titulaire de permis	Spruce / Epinette	Pine / Pin	Hardwood / Feuillus	Softwood / Résineux	Hardwood / Feuillus	Total	(m3)
Alliance-Couturier Inc.	14,230	--	--	--	--	14,230	--
Ashley Colter (1961) Ltd. (F'ton)	2,230	--	--	--	--	2,230	--
Atlantic Pressure Treating Limited	12,170	380[a]	--	--	--	12,550	--
Av Cell Inc.	--	--	--	--	--		15,000[b]
Brownlane Lumber Ltd.	2,010	190	--	--	--	2,200	--
Devon Lumber Co. Ltd. (F'ton)	15,530	--	870	--	--	16,400	--
Donald E. Beckett Ltd.	970	--	--	--	--	970	--
F. C. Alexander Limited	--	650	--	--	--	650	--
Flakeboard Co. Ltd	--	--	--	12,550	--	12,550	--
Garant.Div. of Hanson Kidde Canada Inc.	--	--	--	75[c]	--	75	--
H. J. Crabbe & Sons Ltd.	12,115	--	--	--	1,040	13,155	--
J. D. Irving, Limited	2,020	--	--	--	--	2,020	--
James Sparkes & Sons Ltd.	--	--	--	4,050	2,850	6,900	--
Juniper Lumber Company Ltd.	9,715	--	--	--	--	9,715	--
Lindsay Lumber	--	--	660[d]	--	--	660	--
Little's Lumber Ltd.	3,290	190	--	--	2,370	5,850	--
M. L. Wilkins & Son Ltd.	51,200	910	--	--	--	52,110	--
Nelson Forest Products Inc.	980	--	--	4,230[e]	--	5,210	--
North American Forest Product (Belanger)	--	2,425	--	--	--	2,425	--
R. L. Latte Inc.	--	--	--	2,890[f]	--	2,890	--
Speciality Maples	--	--	--	70[g]	--	70	--
St. Anne-Nackawic Pulp Co. Ltd.	--	--	--	124,445	--	124,445	--
SWP Industries (Goldsmith)	--	--	4,180	--	--	4,180	--
Veneer Products of NB (1981) Ltd.	--	--	--	1,930	--	1,930	--
First Nations	6,790	260	310	5,400	340	13,100	--
Total / Totale	**133,250**	**5,005**	**6,020**	**155,640**	**6,600**	**306,515**	

*ALL TREELENGTH ALLOCATIONS LESS VENEER UNLESS OTHERWISE NOTED
*TOUTES LES ALLOCATIONS DE TRONCS ENTIERS SAUF QUE LE BOIS PLACAGE À MOINS D'INDICATION CONTRAIRE

a - Red pine poles. / Poteaux de pin rouge.
b - Softwood pulpwood and/or chips from Sub-licensees. / Bois à pâte ou copeaux de résineux des titulaires de sous-permis.
c - Ash. / Frêne.
d - Treelength. / D'arbres entiers.
e - Includes 2 780 m3 of aspen. / Comprend 2 780 m3 de tremble.
f - Aspen. / Tremble.
g - Includes 50 m3 curly maple sawlogs and 20 m3 bird's eye maple sawlogs. /Comprend 50 m3 billes d'érable madré. 20 m3 billes de moucheté.

SCHEDULE F - 2000

License No. 9 / Permis N° 9 - Carleton

Annual Allocation of Timber From Crown Lands (m3 / year)

Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)

Licensee / Titulaire: Juniper Lumber Company Ltd.

Licensee / Titulaire	Spruce / Jack Pine / Epinette / Sapin	White Pine / Pin blanc	Red Pine / Pin rouge	Hardwood / Feuillus	Hemlock / Pruche	Total	Cedar / Cèdre (D)
Aberdeen Produce Co. Ltd.	--	--	--	1,500[a]	--	1,500	--
Atlantic Pressure Treating Limited	--	40[b]	--	--	--	40	--
Flakeboard Co. Ltd	--	--	--	11,620	--	11,620	--
Garant,Div. of Hanson Kidde Canada Inc.	--	--	--	40[c]	--	40	--
H. J. Crabbe & Sons Ltd.	26,155	950	--	--	1,075	28,180	--
James Sparkes & Sons Ltd.	--	--	--	2,420	--	2,420	--
John W. Jamer Ltd.	1,140[d]	320	--	--	--	1,460	--
Juniper Lumber Company Ltd.	125,260	--	--	--	--	125,260	--
Lindsay Lumber	--	--	480[e]	--	--	480	--
Nelson Forest Products Inc.	1,200	--	--	870[f]	--	2,070	--
North American Forest Product (Belanger)	--	1,200	--	--	--	1,200	--
North American Forest Products Ltd.	--	--	800	--	--	800	--
R. F. Sadler Ltd.	--	--	--	2,230	--	2,230	--
St. Anne-Nackawic Pulp Co. Ltd.	--	--	--	71,140	--	71,140	--
SWP Industries Inc.	--	--	2,210	--	--	2,210	--
Veneer Products of NB (1981) Ltd.	--	--	--	1,450	--	1,450	--
William F. Tompkins & Sons Ltd.	--	--	--	1,170	--	1,170	--
First Nations	8,320	140	180	3,000	60	11,700	--
Total / Totale	**162,075**	**2,650**	**3,670**	**95,440**	**1,135**	**264,970**	

*ALL TREELENGTH ALLOCATIONS LESS VENEER UNLESS OTHERWISE NOTED

*TOUTES LES ALLOCATIONS DE TRONCS ENTIERS SAUF QUE LE BOIS PLACAGE Ä MOINS D'INDICATION CONTRAIR

a - Fuelwood. / Bois de chauffage.
b - Red pine poles. / Poteaux pin rouge.
c - Ash. / Frêne.
d - Includes 950 m3 treelength less veneer and 190 m3 larch sawlogs. / Comprend 950 m3 d'arbres entier moin placage. 190 m3 billes de sciage de mélize.
e - Treelength. / D'arbres entiers.
f - Includes 870 m3 aspen. / Comprend 870 m3 de tremble.

SCHEDULE F - 2000
License No. 10 / Permis N° 10 - Restigouche-Tobique
Annual Allocation of Timber From Crown Lands (m3 / year)
Allocation en Bois Annuelle sur les Terres de la Couronne (m3 / année)
Licensee / Titulaire: FraserPapers Nexfor

DRAFT

Licensee / Titulaire	Spruce-pine-fir pulpwood / Epinette-pin-sapin pâte	Pine logs / Pin rond	Cedar / Cèdre	Hardwood pulpwood / Feuillus pâte	Chemical / Procédé	Total	Change / Changement
Alliance-Couturier Inc.	168,420[a]	--	--	--	--	168,420	(105,000)
Ateliers Arpin Ltee	--	--	--	775	--	775	--
Atlantic Pressure Treating Limited	--	20[b]	--	--	--	20	--
Av Cell Inc.	--	--	--	124,350	--	124,350	10,000
Begin Lumber Ltee	--	--	--	10,305	--	10,305	--
Clair Industrial Development Corp.Ltd.	--	--	700	--	--	700	--
Deniso Lebel Inc.	196,530[c]	--	--	--	--	196,530	--
Flakeboard Co. Ltd	--	--	--	4,800	--	4,800	--
FraserPapers Nexfor	95,780[c]	--	--	--	--	95,780	105,000
Groupe Savoie Inc.	--	--	--	54,740[d]	--	54,740	--
H. J. Crabbe & Sons Ltd.	3,140	80	--	--	--	3,220	--
H.T.M. Industries Inc.	--	--	--	10,000[e]	--	10,000	(10,000)
John W. Jamer Ltd.	3,280	40	--	--	--	3,320	--
Junction Lumber Products Inc.	--	--	950	--	--	950	--
Juniper Lumber Company Ltd.	19,620[c]	--	--	--	--	19,620	--
Kedgwick Lumber Co. Ltd.	--	--	7,110[f]	--	--	7,110	--
Lattes Waska Laths Inc.	--	--	--	2,880[g]	--	2,880	--
Nelson Forest Products Inc.	4,550	--	--	960[a]	--	5,510	--
North American Forest Product (Belanger)	--	1,155[f]	--	--	--	1,155	--
North American Forest Products Ltd.	76,590[c]	--	3,970	--	--	80,560	--
Onil Thibeault & Fils	1,185	--	700	290	--	2,175	--
Plancher Heritage Flooring Ltd.	--	--	--	6,000[h]	--	6,000	--
R. F. Sadler Ltd.	--	330	--	5,280	--	5,610	--
Walker Lumber	--	--	--	960[g]	--	960	--
First Nations	30,780	80	740	8,000	--	39,600	--
Total / Totale	**599,875**	**1,705**	**14,170**	**229,340**	**0**	**845,090**	

a - Treelength less veneer. / D'arbres entiers moin placage.
b - Red pine poles. / Poteaux pin rouge.
c - All treelength allocations. / Toutes les allocations d'arbres entiers.
d - Includes 5 760 m3 aspen, and 39 390 m3 hardwood pulpwood, plus 9 590 m3 hardwood logs. / Comprend 5 760 m3 de tremble, 39 390 m3 de bois à pâte de feuillus, plus 9 590 m3 billes de feuillus.
e - Pulpwood quality. / Qualité de bois à pâte.
f - Treelength. / D'arbres entiers.
g - Aspen. / Tremble.
h - Treelength material for 2 years to expire March 31, 2002. / Arbres entiers pour la période de deux ans prenant fin le 31 mars 2002.

Table 2-1 Total Roundwood Harvested and Consumed m3 in New Brunswick During 1998					
		Softwood	Hardwood	Total	% Crown of Total
Pulpmills	Crown	714,784	1,063,279	1,778,063	49
	Other	668,389	1,165,199	1,883,588	
	Total	1,383,173	2,228,478	3,661,651	
Sawmills	Crown	3,002,643	259,753	3,262,396	48
	Other	3,231,074	358,931	3,590,005	
	Total	6,233,717	618,684	6,852,401	
Total All Mills	Crown	3,717,427	1,323,032	5,040,459	48
	Other	3,899,463	1,524,130	5,423,593	
	Total	7,616,890	2,847,162	10,464,052	
Total Volume m^3/year Lost Due to Protected Areas				210,839	
% of Crown AAC					4.2
% of Provincial Harvest					2.0

Source: Timber Utilization Survey for the Year 1998, DNRE.

Calculations of job loss due to the AAC impact of the Protected Areas are summarized in the following tables.

Harvesting Employment and Total Volume of Roundwood Harvested 1990-1997			
	Wood Harvested (000 m^3)	Employment	m^3/Jobs
1990	8,824	4,073	2,166
1991	8,643	5,024	1,720
1992	9,205	4,182	2,201
1993	8,959	4,381	2,045
1994	9,269	3,631	2,553
1995	10,055	4,754	2,115
1996	10,865	4,671	2,326
1997	11,226	4,941	2,272
Average of eight years			2,175
Harvesting Employment Impact			
Reduction in AAC due to Protected Areas		210,839 m^3	
m^3/Job		2,175	
Harvesting Job Potential Loss		97 jobs	

Wood Processing Employment Impact Coefficient			
Wood Manufacturing (Sawmills)	m^3	Employ 1997	m^3/job
Total Wood Consumption	6,852,401	4,944	1,386
Paper and Allied	3,611,651	5,087	709

Sawmill Employment Impact	
Total AAC Impact Attributable to Protected Areas	210,839 m^3
% of Wood Consumed by Sawmills	65%
Wood Lost to Sawmills	137,045 m^3
m^3/Job	1,386
Potential Sawmill Job Loss	99 jobs

Pulp & Paper Mill Employment Impact	
Total AAC Impact Attributable to Protected Areas	210,839 m^3
% of Wood Consumed by Pulp & Paper Mills	35%
Wood Lost to Pulp & Paper Mills	73,794 m^3
m^3/Job	709
Potential Pulp & Paper Job Loss	104 jobs

Sources: Wood harvested statistics - Compendium of Forestry Statistics - Employment - Statistics Canada - AAC Impact and % Wood Consumed - DNRE.

Alternative View on Estimated Wood Supply Impacts

In March of 1999, the New Brunswick Natural Area Coalition and the World Wildlife Fund had an analysis done on wood supply impacts attributable to the Protected Areas Strategy by REMSOFT INC. They used the Woodstock model. They describe it as a better, faster, and easier way to model AAC impacts than that used in the 1997 Management Plan to Assess the Wood Supply Impacts on Licences. The Woodstock model allows forest models to be formulated as linear programming models, as well as simulation models.

Using this alternative planning tool (modelling systems), they concluded licensees may be in a position to increase their AAC above previously determined levels.

In their analysis, they were able to increase the calculated AAC levels about 18% over those in the 1997 Management Plan. After accounting for Protected Areas, they suggested the net change to AAC on this license was a slight increase rather than the anticipated reduction. By comparing the AAC's from the spatial plan submitted in 1997 to those from the spatial analysis using current models and data, they concluded that Protected Areas could be established without dropping AAC below the 1997 level. In fact, the AAC levels could increase slightly.

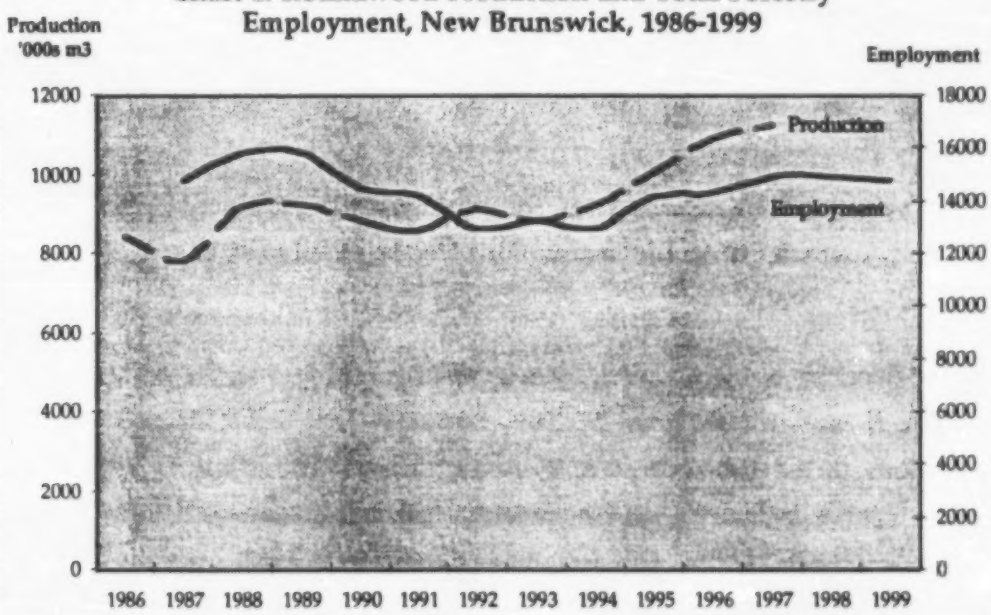
This is an interesting result. We understand that for the 2002 Crown Land Management Plan[1] the Woodstock model will be used exclusively as will new inventory data determine AACs. Until the new model and new data are applied, comprehensively determining the marginal impact of implementing the Protected Areas strategy must rely on the approach used to determine the wood supply in the 1997 management plan.

[1] Also, wood from the former Georgia Pacific lands (acquired by the province) could be included in the Crown land AAC. Our understanding is that wood from these lands are currently fully utilized by the New Brunswick forest industry. Inclusion of these lands may allow for an increment in AAC from Crown lands but will not result in an increment available to New Brunswick industry overall as this wood is currently part of the total raw material supply.

Forestry Employment Context

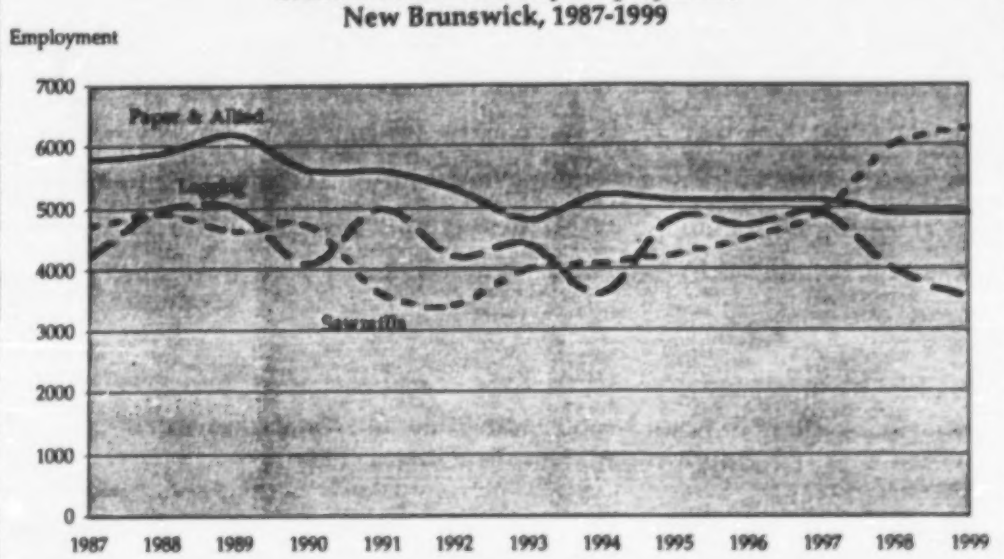
Total employment in the New Brunswick forest industry, including harvesting and processing has fluctuated in a range between a high of 15,000 direct jobs in the late 1980s to less than 13,000 in the early 1990s. By 1997, employment levels were back to about 15,000 jobs, employment levels have dropped in both 1998 and 1999. As shown in Chart 1, throughout this period of employment fluctuation, roundwood production in the province of New Brunswick has been steadily increasing.

Chart 1: Roundwood Production and Total Forestry Employment, New Brunswick, 1986-1999



Within the forestry sector, employment trends have been markedly different in the logging, sawmills and paper and allied industries. These trends are depicted in Chart 2. For logging employment, levels have shown a great deal of variation, literally bouncing between 4,000-5,000 jobs with a significant reduction most recently from almost 5,000 jobs in 1997 to between 3,000-4,000 in 1999.

Chart 2: Forest Industry Employment, New Brunswick, 1987-1999



In the paper and allied industries, the employment trend is more defined as a relatively gradual but steady decrease from in excess of 6,000 jobs in 1989 to less than 5,000 by 1999.

On the other hand, employment by sawmills has almost doubled from 3,400 jobs in 1992 to about 6,300 jobs in 1999. Similarly, the value of manufactured shipments in the sub-sector has increased from $750 million in 1995 to $1.3 billion in 1999. Industry observers note that this trend has been the product of a greater emphasis by the industry and government in producing higher value-added products. We understand a far greater proportion of raw wood production in New Brunswick now enters the processing system by going to sawmills first. The pulp and paper industry now receives much of its fibre supply from residue and chip by-products of the sawmilling industry. This improved utilization of roundwood production has lead to higher value of industrial output attributable to the industry as a whole.

This reorientation of the industry has required considerable labour force adjustment over the past ten years. This demonstrated ability to adapt to new circumstances by the industry as a whole will facilitate the adjustment required

by industry to accommodate the loss of wood supply attributable to the Protected Areas. The majority of job losses will occur in harvesting activity. If the sawmill industry continues to increase employment levels, the harvesting workforce could, with the assistance of training programs, adjust their skill set to those required by this segment of the industry. Overall, the magnitude of job losses attributable to the Protected Areas will at the maximum be less than 2% of overall industry employment. This industry, as shown in the past decade, experiences fluctuations of employment levels on a regular basis that exceed this level of variation and has adopted to these changes successfully.

APPENDIX 3

DEFINITION OF TERMS RELATED TO ECOSYSTEM VALUATION

Definition of Terms Related to Ecosystem Valuation

Functions, services, values, risk and several other terms are used in different ways in the ecosystem assessment literature and in the economics literature. The following definitions are offered here to minimize confusion over what will be used in the following sections as building blocks of ecosystem value indices.

Functions – the biophysical processes that take place within an ecosystem (e.g., fish and waterfowl habitat, carbon cycling, nutrient trapping). The level of ecosystem function depends on site and landscape characteristics and can be assessed independently of any human context.

Services – the beneficial outcomes that result from ecosystem functions (e.g., better fishing and hunting, cleaner water, better views, reduced human health and ecological risks). These require some interaction with, or at least some appreciation by, humans. However, they can be measured in physical terms (e.g., increased catch rates, greater carrying capacity, more user days, reduced risk, property damage avoided). The capacity of an ecosystem to provide services can be estimated without any ethical or subjective judgements about how much the services are worth. The types of potential services depend to some degree on the level of functions, but predominantly on other factors (e.g., access, proximity to people or problems caused by people).

Values – Defined in strict economic terms, the full range of ecosystem benefits includes each person's willingness-to-pay in dollars for each ecosystem service summed across all people and all services. In most cases, tracing and estimating the absolute (dollar) value of an ecosystem is impossible. However, overall willingness to pay for a ecosystem services depends on the number of people with access, their income and tastes, the cost of access, the availability of substitutes, and other factors related to local, regional, and national supply and demand.

Features – on-site characteristics of an ecosystem (e.g., soil, vegetative cover, hydrology) that establish its capacity to perform or support various environmental functions (e.g., support fish, birds, wildlife).

Landscape context – proximity of the ecosystem to other natural and man-made features in the surrounding landscape. Landscape context influences: a) the ecosystem's opportunity to function at capacity, b) the services that will flow from various functions, c) the value of those services, and d) the risk that the services will not persist.

Preferences – the identification of one ecosystem service as being more important or valuable than another. For purposes of comparing ecosystem values, individual and community indicators of ranked preferences can be as useful as absolute (dollar-based) estimates of value and are much easier to determine.

Risk – the volatility of potential outcomes. In the case of ecosystem values, the important risk factors are those that affect the possibility of service flow disruptions and the reversibility of service flow disruptions. These are associated with controllable and uncontrollable on-site risk factors (e.g., invasive plants, overuse, restoration failure) and landscape risk factors (e.g., changes in adjacent land uses, water diversions).

Source: "Assessing the Economic Value of Biodiversity Using Indicators of Site Conditions and Landscape Context", by Dennis M. King, Ph.D., and Lisa A. Wainger, Ph.D., University of Maryland, Center for Environmental Science, Solomons, Maryland (USA), September 25, 1999, presented at the Workshop on Benefit Valuation of Biodiversity Resources, October 18-19, 1999, Paris, France.

APPENDIX 4

INTERNATIONAL AND NATIONAL COMMITMENTS

International Commitments

In 1992, Canada signed the *Convention on Biological Diversity* which obligated it to establish a system of protected areas, or areas where special measures need to be taken to conserve biological diversity. While this Convention does not set out what percentage of Canada's territory should be included in this system, it outlines a number of directions for managing in-situ conservation in Article 8.[1] The United Nations Conference on Environment and Development in 1992 adopted The *Forest Principles* (*Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests*). These also required countries to protect "... ecologically viable representative or unique examples of forests, including primary/old-growth forests, cultural, spiritual, historical, religious and other unique and valued forests of national importance".[2]

On February 25, 1997, Canada became one of 22 countries officially committed to achieving the World Wildlife Fund's global *Forests for Life* target of establishing an ecologically representative network of legally protected areas covering at least 10% of the world's forest by the year 2000. In making this pledge, the Government of Canada reiterated its commitment from the *Canada Forest Accord* to establish protected areas representing up to 12% of its land base.[3]

In 1998, the *G-8 Action Programme on Forests* called on Canada to achieve a consensus on the categories of protected areas, using the IUCN protected areas management categories[4] and other classification systems. This program also urged Canada to identify key forest types not sufficiently represented within the existing network of protected areas.[5]

---

1 Convention on Biological Diversity text; http://www.unep.ch/bio/conv-e.html

2 Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests text; http://www.igc.apc.org/habitat/agenda21/forest.html

3 World Wildlife Fund Status Report, Canada's Commitment to Forest Protected Areas, August 16, 1999; http://www. panda.org/canadianforests/canada48.pdf

4 These categories include: strict nature reserve/wilderness area, national parks, natural monuments, habitat/species management area, protected landscape/seascape, and managed resource protection area.

5 G8 Action Programme on Forests, May 9, 1998; http://birmingham.g8summit.gov.uk/forfin/forests.shtml

National Commitments

The federal government's *Green Plan* in 1992 first referred to a long-term goal to set aside as protected space 12% of the country (including protected areas where limited harvesting is allowed). In 1992, the Canadian Council of Forest Ministers (which represent Canada's federal, provincial and territorial governments) and other signatories to the *Canada Forest Accord* agreed to "... work towards completing by the year 2000 a network of protected areas representative of Canada's forests, to provide ecological benchmarks, protect areas of unique biological value and ensure wilderness experience".

Later that year, Canada's federal, provincial and territorial ministers of the environment, parks and wildlife[6] became officially committed, through the Tri-Council *"Statement of Commitment to Complete Canada's Networks of Protected Areas"* to designate protected areas representing Canada's land-based natural regions by the year 2000.[7] The WWF-sponsored 10 year Endangered Spaces Campaign launched in 1989 has been used to ensure that these government commitments are met.[8] It has been endorsed by the federal, provincial and territorial governments as well as by more than 300 non-governmental organizations.[9]

The Whitehorse Mining Initiative (1994) involves the participation of five sectors–the mining industry, senior governments, labour unions, Aboriginal peoples and the environmental community. Among other things its calls for the establishment of an ecologically based system of protected areas in Canada.

In 1995, the *Canadian Biodiversity Strategy* was prepared and endorsed by all provincial, territorial and federal governments as a national guide to the *Convention on Biological Diversity*.[10] This strategy suggested criteria for selecting new protected areas and called

---

6 That is, the Canadian Councils of Ministers of the Environment, the Canadian Parks Ministers' Council and the Wildlife Ministers' Council of Canada

7 World Wildlife Fund Status Report, Canada's Commitment to Forest Protected Areas, August 16, 1999; http://www. panda.org/canadianforests/canada48.pdf

8 World Wildlife Fund, "Canadian governments challenged to protect 43 million acres of new wilderness areas by Canada Day, 2000, News Release, November 30, 1999; http://www.wwfcanada.org/news-room/Spaces%20Releases/Nat_eng.htm

9 World Wildlife Fund, "Despite another low grade, WWF has hopes for NB's protected areas strategy in the next year", News Release, April 27, 1999; http://www.wwfcanada.org/new-room/media/nb.htm

10 Canadian Biodiversity Strategy: Canada's Response to the Convention on Biological Diversity; http://www.cciw.ca/eman-temp/reports/publications/rt_biostrat/

for inventories, plans, guidelines, and monitoring programs for the establishment and maintenance of protected areas.[11] It directed provincial governments to make every effort to complete Canada's networks of protected areas representative of land-based natural regions by the year 2000.

In 1998, Canada's new *National Forest Strategy* included a restatement of the commitment to protected, as there had been less than anticipated progress toward completing a network of protected areas.[12] As of April 1999, 6.4% of Canada's lands were represented with protected areas.[13] It is only roughly halfway to achieving its millennium forest commitment, according to the WWF. The total land area protected in Canada has increased since the beginning of the Endangered Spaces Campaign from 25,446,300 ha in 1989 to 63,644,200 ha in 1999.[14]

---

[11] Natural Resources Canada, Canadian Forest Service, *The State of Canada's Forests 1998-99*, Protected areas: safeguarding Canada's biodiversity; http://www.nrcan.gc.ca/cfs/proj/ppiab/sof/sof99/spart1.shtml

[12] Natural Resources Canada, Canadian Forest Service, *The State of Canada's Forests 1998-99*, Protected areas: safeguarding Canada's biodiversity; http://www.nrcan.gc.ca/cfs/proj/ppiab/sof/sof99/spart1.shtml

[13] World Wildlife Fund, "Federal government merits only C grade for progress on new national parks...", News Release, April 27, 1999; http://www.wwfcanada.org/news-room/media/fed.htm

[14] Monte Hummel (ed), *Endangered Spaces - The Future of Canada's Wilderness*, Key Porter Books, Toronto, 1989; 1998/1999 Progress Report, Conservation Lands in Canada, WWF Canada.

APPENDIX 5

MINERAL POTENTIAL FOR EACH PROTECTED AREA

MINERAL POTENTIAL FOR EACH PROTECTED AREA

Jacquet River Gorge

The Jacquet River Gorge area straddles the boundary between two of the most mineralized zones of the province. The Miramichi Zone along the southern part of the area contains the Tetagouche Group volcanic and sedimentary rocks which contain much of the massive sulphide mineralization in the Bathurst Camp. Most of the area is underlain by shallower and more felsic volcanic and associated sedimentary rocks of the younger Tobique-Chaleur Zone. Both are cut by mineralized granites in the area - the Antinouri Lake granite that occupies the northeast portion of the area and the Nicholas Denys granite just to the southeast of the area.

Compared to the other areas in this study, Jacquet River is highly mineralized. There are about 100 documented mineral occurrences within the area and another 100 occurrences just beyond the boundaries of the area.

Most mineral occurrences are associated with the two granites. A north-south band of mineral occurrences lies along the western contact of the Antinouri Lake granite through the middle of the area. The most significant of these are polymetalic (Cu-Pb-Zn-Ag) skarns in carbonate and calcareous rocks immediately adjacent to the granites. Most of the granite itself is without mineral occurrences except for an occurrence of molybdenum near the western contact.

Another group of mineral occurrences is at the southeast corner of the area. Most of these are the Nigadoo quartz-carbonate veins with Zn-Pb-Cu-Ag in the contact aureole of the Nicholas Denys granite. Minor past production has come from some of these relatively narrow veins.

A great variety of mineral occurrences associated with the margins of the Nicholas Denys granite lie to the southeast of the area.

At the north-central boundary of the area are a set of minor veinlets associated with felsic volcanic rocks along the Jacquet River Gorge. None of these many occurrences is significant but there are a great number of them in the records.

At the south-central part of the area is a set of quartz-carbonate stockworks - the Melanson Brook showings. Past drilling has indicated minor Zn-Pb with significant Ag.

At the northwest margin of the area are the mineral occurrences of MacNeil Brook and Wildcat Brook with significant Ag values associated with polygenetic Zn-Pb in veins and breccias.

Gold is known from the southwest corner of the area at Anne's Creek. This area is currently undergoing active exploration.

This area is highly mineralized compared to other the areas proposed for protection. There is a variety of targets and a significant set of these is in a band in the middle of the area. Areas with few occurrences are in the centre of the west half of the area and the centre of the Antinouri Lake granite in the northeast corner of the area. Active claims at the time of this review were limited to the gold prospects at the southwest corner.

Central Highlands

Two significant mineral occurrences are present in this area and both are at the easternmost boundary of the area.

Popple South occurrence of Fe-sulphide minerals in troctolite. This has been a target for Ni exploration in eastern Canada in the last decade. This is a small showing with nickel analyses barely above background levels. Favourable host rock is unlikely in most of the area.

Recent exploration activity is concentrated to the northeast of the area in rocks of the Tetagouche Group which are favourable to Bathurst Camp type mineralization. Activity as marked by claim history and favourable host rocks end just at the boundary of the area.

Most of the area is underlain by granitic rock younger than the prospective rocks to the north and east. There is good outcrop in the area, but little evidence of mineralization from past activity.

Mineral resource potential of this area is relatively low and limited mainly to the most eastern edges of the area.

Kennedy Lakes

Mineral resource potential of this area is the highest of the areas considered. The potential resources are varied and some located well within the area.

Five mineral occurrences are located within or immediately adjacent to the proposed area. The only one of any significance, together with the only recent exploration activity are at the southernmost boundary of the area centred on the Fall Brook (Johnson) showing. This showing is a Sn-W-Mo greisen with known values of Pb and Ag.

All mineral occurrences in the area are related to the margins of granite bodies that have no evidence of mineralization within them. Granitic rock underlies virtually the entire area.

Canaan Bog

There area only two mineral occurrences on file at the edges of this area. Both of the occurrences are of little current importance. One is a bog Mn-Fe occurrence commonly related to spring-water discharge under bogs. The other is a note of pyrite in a spoil pile of an old coal occurrence northeast of the area. There is no indication of metallic mineral potential in the area.

A roughly east-west line of 3 peat bogs from the eastern margin of the area are being developed. The furthest east is now being exploited, the middle one is under lease for subsequent development by the same operator, and the western one is under option by the same operator. The lifetime of this operation and potential of the western bog should be considered in more detail.

The other peat deposits noted with potential in the area are at the far western end of the area.

Metallic mineral resource potential of this area is very low. Peat resources, however, are known and viable.

Grand Lake Meadows

This area has no mineral occurrences on record. The closest is several kilometres to the south and is an unconfirmed gold showing from the last century. While much of the

Note: Ag = silver
Au = gold
Cu = copper
Fe = iron
Pb = lead
Mn = manganese
Mo = molybdenum
Ni = nickel
Sn = tin
W = tungsten
Zn = zinc

area is underlain by bog, none of the ground has been noted to have peat development potential. Most of the area is occupied by the Burpee Game Refuge and is currently protected.

Mineral resource potential of this area is very low. There is also low potential for peat resources due to poor quality and co-location of the Burpee game sanctuary. Hydrocarbon potential is also quite speculative with more favourable ground located deeper in the Carboniferous Basin and further to the east where maturation temperatures are lower.

Nerepis Hills

This area has a north-south band of similar mineral occurrences throughout its western half. The occurrences are polymetallic showings hosted by greisens at the top of the Mt. Douglas granite. Most have anomalous amounts of Sn, W, and Mo as cassiterite, wolframite, and molybdenite. All are relatively small in size and modest in contained metal, but none have seen extensive assessment. Most of the exploration effort in the area has been extended in the Westfield area on the Nerepis - West Brook skarn deposit just to the south of the area. Associated mineralization may extend into the area to the west from the east boundary.

A set of minor polymetallic vein showings to the north and east of the area is currently prospective for gold. Similar rocks underlie the northernmost and northeastern corner of the area but most of the similar ground is well to the west of the area.

The mineral resource potential of this area is moderately low and mostly related to the periphery of the Westfield area to the immediate south of the area. In addition, fringes of prospective ground is represented by the northern and far eastern margins of the area.

Loch Alva

This area is surrounded by intensely mineralized rock, but the area itself has few mineral occurrences recorded. To the south are the Cape Spencer type precious metal deposits, the northernmost of which (Scott Falls Dam #1) is just at the southern boundary of the area. Favourable rock for this type of deposit is unlikely to extend into the area.

Most of the occurrences recorded within the area are mineral curiosities only. The most important is the Eagle Lake occurrence in the middle of the area unlike most of the mineral occurrences in the Pas, which lie at the margins of the areas and at the margins of mineralized ground. Here minor Cu, Mo, and Ag mineralization is reported from a possible porphyry copper setting. Eagle Lake has seen a moderate amount of exploration in the past and thus has partially been assessed.

The mineral resource potential of this area is relatively low. The best area is in the middle of the area, but has received a modest level of assessment in the past.

Caledonia Gorge

No mineral occurrences are reported from this area, but several are on file that lie just to the west and uphill from the proposed area. The eastern two thirds of the area are underlain mostly by granites for which there are no recorded mineral occurrences. The western third of the area is underlain by volcanic rocks of the Broad River Group which have two significant prospects - Teahan (mined in the late 19th century) and Lumsden.

The Lumsden Prospect saw mineral development work in the early part of this century and several shafts, tunnels, and adits at Lumsden date from this time. The Lumsden prospect also saw extensive exploration and evaluation in the middle of this century with drilling in 1953. The prospect is a Zn-Cu-Ag deposit in a strata bound, lens-shaped array of veins in highly altered Precambrian volcanic rocks. The prospect is immediately adjacent to the area and immediately uphill from the gorge. The access road to the Lumsden property, however, is in the Gorge.

When developed in the early part of the century the copper and silver would have been the objects of exploration, while today the zinc would receive attention as well. Most of the prospective area for this type of deposit would be to the west of Lumsden as the host rock is covered by younger cover to the immediate east.

Most of the prospective ground in the mineral belt defined by the Lumsden and Teahan prospects is to the west of the area with only the easternmost fringe immediately east of the Lumsden prospect being within the area.

Mineral resource potential is most likely related to extensions of the Lumsden deposit, assessed in the middle of this century.